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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE EUROPEAN PARLIAMENT AND THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE

Towards a more effective use of tax incentives in favour of R&D

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1. INTRODUCTION

One of the main political commitments of the EU is to strengthen the process of structural reforms of the Member States economies, which was originally expressed in the 2000 Lisbon strategy for growth and employment agreed by Member States. The Lisbon strategy consists of a series of interconnected reforms aimed at promoting a European Union with a more competitive economy, more and better jobs, higher social standards and improved sustainable development. This discussion was followed up by intense work over the last years, in particular based on the 3% investment in R&D target set at the Barcelona European Council in March 2002 ("3% target"). The related Action Plan[1] sets out a series of initiatives to leverage more private sector investment in R&D, in particular through the optimal combination of public financing instruments. Following the renewal of the Lisbon Strategy at the 2005 Spring European Council and the launch of a new partnership for growth and employment, the Commission adopted in October 2005 a Communication presenting a Common Approach for More Research and Innovation[2], with a focus on improving the framework conditions for private investment in research and innovation.

But, as the Lisbon strategy encompasses many policy areas where competence lies primarily with Member States, real progress can only be achieved through combining the traditional "Community method" of EU legislation and a process of co-ordination among Member States. In this context, the Spring European Council called for the Open Method of Coordination to be used in support of research policy-making[3] and the Council subsequently invited the Committee for Scientific and Technical Research (CREST)[4] to act as an operational interface to oversee the application of this method in support of the 3% target[5] ("OMC-3%").

Following a first report issued in October 2004[6] which included a number of recommendations in different policy areas including fiscal measures and research, CREST established in March 2005 an expert group on the "Design and evaluation of tax incentives to promote business research, development and innovation" with the task of producing guidelines for the design and use of fiscal measures and for the evaluation of fiscal measures. The present Commission Staff Working Document relies to a large extent on insight gained through the application of the OMC-3% and in particular on the conclusions reached by the aforementioned expert group in March 2006[7].

2. USE OF R&D TAX INCENTIVES

Both economic theory and empirical analysis emphasise that R&D plays a key role in achieving productivity gains and economic growth, and that it has the characteristics of a public good, meaning that the social return of the investment is higher than the private return

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1 COM(2003)226 "Investing in research: an action plan for Europe"
2 COM(2005)488 "More Research and Innovation: a common approach"
3 Presidency Conclusions of Brussels European Council of 22-23 March 2003
4 CREST is an advisory body whose function is to assist the Council and the Commission in the sphere of research policy
5 Council Resolution of 22 September 2003
6 CREST report on the application of the open method of coordination in favour of the Barcelona research investment objective, 1.10.2004
7 CREST Expert Group Report "Evaluation and design of R&D tax incentives", 17 March 2006

to the investing firm. In presence of such market failure, which unchecked would lead to under investment in R&D by business, public intervention is justified. In effect, Member States have introduced a variety of instruments to support business R&D, such as direct grants or subsidies, tax incentives, guarantee mechanisms or support to risk capital. Their combination and intensity differs from one country to the other, depending mainly on policy objectives, the structure of the economy and the strengths and weaknesses of the national research and innovation system. Moreover, evidence suggests that instruments cannot easily be substituted and must be carefully designed to ensure consistency and synergy.

2.1. Recent trend

In this context, a growing number of countries have recently implemented or further developed tax incentives for firms to conduct more research, and there is a growing tendency to consider that this form of public support is an important element of the policy mix to promote business R&D. Consequently, tax incentives are now being used more than previously: in 1996, 12 OECD countries offered tax incentives; this figure rose to 18 in 2004, with most of the increase coming from European countries in the context of the EU objective to raise the level of investment in R&D.

These tax incentives are however designed in different ways, e.g. through a reduction of the tax base or the tax rate, applied to either the total amount of R&D expenses (volume-based) or only additional R&D performed over a certain period of time (increment-based), which results in a somewhat fragmented landscape for firms planning to invest in R&D. At present, there is no harmonisation or co-ordination of these national measures in the EU and their progressive convergence through exchange of information and mutual learning between MS is so far little advanced.

2.2. Estimated impact

In support to the observed trends, there is established evidence that, on average, R&D tax incentives induce an increase in a firm's expenditure on R&D by amounts that are similar or greater than the foregone tax revenues, and that this entails in the long run great benefits for the economy at large.

The most robust studies on the effectiveness of R&D tax incentives rely on econometric models that estimate the price elasticity of research. When price elasticity of research is negative, decreasing the price of research stimulates additional R&D activity equivalent to the product of the price elasticity of research and the effective marginal rate of the tax incentive. The majority of studies conclude that the short-term price elasticity of research is close to minus one[8], which is clear evidence that R&D tax incentives positively influence the total amount of R&D undertaken[9]. Furthermore, comparisons of price elasticity of research over short- and long-term suggest that the additional R&D expenditure induced by fiscal incentives

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[8] In: Van Pottelsberghe B., Nysten S., Megally E. (2003), Assessment of the Belgian fiscal incentives for business R&D, *SSTC and CEB Working Paper*, Solvay Business School, ULB.

[9] Klassen K., Pittman J., Reed M. (2003), A cross-national comparison of R&D expenditure decisions: tax incentives and financial constraints, *Contemporary Accounting Research*, 21(3) Fall, pp. 639-680; Hall B., Van Reenen J. (2000), How effective are fiscal incentives for R&D? A review of the evidence, *Research Policy*, Vol. 29, pp.449-469; Dumagan J.(1995), Re-examining the cost-effectiveness of the research and experimentation tax credit, *Report Series*, Economics and Statistics Administration, USA.

increases over time[10] and, in the long term, more than compensates the amount of foregone tax revenues[11].

Another important aspect of R&D tax incentives is that they contribute to attracting mobile R&D activities, as shown by several studies on the globalisation of research. A recent study has suggested that tax incentives in the United States, rather than leading to an increase of the total amount of business R&D, may be driving firms to relocate their mobile R&D within the US without significantly changing their overall level of expenditure on R&D[12].

However, R&D tax incentives implemented in countries with low corporate tax rates can be less effective in attracting mobile R&D activities, as multinational firms might prefer to allocate their R&D expenditure to subsidiaries or parent firm if these are located in countries with high corporate tax rates in view of decreasing their taxable base.

3. GUIDANCE FOR DESIGNING R&D TAX INCENTIVES

Due to varying economic and industrial structures, R&D capacity, level of R&D spending, and overall tax environments, the mix of R&D and innovation policy instruments can greatly differ among Member States. Consequently there is not a single answer as to how tax incentives should be designed or evaluated. Nevertheless, on the basis of the evaluation of past experience and the exchange of information carried out among Member States in the framework of the OMC-3%, there is clear evidence that the tax incentives in place stimulate R&D activity and some principles of good design can be identified. In addition some guidance indicating which measures would be indicated as the most promising in given situations - and how to evaluate such measures - can be provided.

3.1. Principles/options of good design

Currently 17 of 34 CREST Countries[13] and 15 of 25 EU Member States have introduced tax incentives for business R&D in their tax legislation. As noted in the report of the first CREST expert group on fiscal measures for research[14] in 2004, there is a great variety in the design of R&D tax incentives among Member States. However, the report also showed that the majority of Member States introduced R&D tax incentives where all types of firms and all forms of R&D activity were eligible.

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10 Bloom, N., Griffith, R., Van Reenen, J. (1998), Do R&D tax credits work? Evidence from an international panel of countries 1979–1994, *Institute for Fiscal Studies Working Paper* W99/8; Hall, B. (1993) R&D tax policy during the eighties: success or failure?, *Tax Policy and the Economy* 7, 1–36; Dagenais M., Mohnen P., Thierrien P. (1997), Do Canadian firms respond to fiscal incentives to research and development ?, *Cahier du CIRANO* 97-s.34.

11 Griffith R., Redding S., Van Reenen J. (2001), Measuring the cost effectiveness of an R&D tax credit for the UK, *Fiscal Studies*, vol. 22, no. 3, pp. 375–399.

12 Bloom N., Griffith R., Van Reenen J., (1998). Do R&D tax credits work? Evidence from an international panel of countries 1979–1994, Institute for Fiscal Studies Working Paper W99r8; Bloom N., Griffith R. (2001), The internationalisation of UK R&D, *Fiscal Studies,* vol. 22, no. 3, pp. 337–355; Wilson D. (2006), Beggar thy neighbour ? The in-state, out-of-state, and aggregate effects of R&D tax credits, Federal Reserve Bank of San Francisco Working Paper Series, Working Paper 2005-08.

13 Austria, Belgium, Denmark, France, Hungary, Ireland, Italy, Malta, the Netherlands, Norway, Poland, Czech Republic, Portugal, Slovenia, Spain, Turkey and the United Kingdom.

14 Report of the Expert Group on Fiscal Measures for Research, CREST 2004

3.1.1. General principles

In general it is recommendable, when designing or revising R&D tax incentives, to follow some general guiding principles. Research on design features of R&D tax incentives shows that Member States and the business community favour a design including elements of simplicity, low administrative and compliance costs, reliability and stability. Accordingly, incentives should be transparent and easily accessible to a broad range of firms to maximise the uptake and hence the increase in R&D and innovation activity. In order to provide reliable and stable framework conditions for firms the incentives should be fixed for relatively long time periods and there should be effective and simple application and auditing rules for firms and administrations. Also certainty should be maintained regarding the amount of tax relief in cases where the level of profit of a firm may vary in time which allows firms to plan investments ahead in time. The nature and basis of incentives should not change too frequently in order to enhance the predictability of eligible R&D activities and costs. In addition, having clearly identified beneficiaries and objectives facilitates the evaluation of the effectiveness of the incentive ex post.

3.1.2. General vs. selective

A more specific issue of design relating to the target group of firms is the choice between general incentives and selective ones. The majority of existing tax incentives aimed at increasing R&D activities are general in nature and, therefore, do not focus on specific types of firms, sectors or technologies. General non-targeted tax incentives have the advantage of reaching the largest number of firms and hence maximise the potential increase in business expenditure on R&D while minimising market distortions. In practice, about half of currently implemented R&D tax incentives limit this general openness with an upper ceiling or cap on the amount of the tax relief available. These caps represent a relative advantage to SMEs (compared to larger firms) as their level of expenditure is usually not affected by these caps. However, about one third of tax incentives in the EU provide specific benefits for SMEs, and a growing albeit more limited number of schemes cater specifically for young innovative SMEs, e.g. the statutes of young innovative enterprises in France and in Belgium.

A Member State might also want to choose to target a particular sector or technology, in view of reinforcing leadership or building critical mass. However, when considering designing such a selective R&D tax incentive, full account should be taken of the legal constraints described in the communication and the appropriateness of other supporting instruments should be considered as well.

3.1.3. Types of regime

Most existing R&D tax incentives in the EU are aimed at reducing the cost of research by reducing the amount of corporate tax paid. The utility and scope of such incentives are commensurate to the effective rates of corporate taxation and can take the form of an allowance to reduce the taxable earnings by more than the actual costs incurred or a credit which reduces the amount of tax payable.

There is a debate as to whether volume or increment based incentives are more effective. Just like the arguments used for general versus targeted measures, this will depend on the specific situation in a Member State and its policy objectives. Volume based incentives which are based on the total expenditure are more useful in maintaining R&D spending where there is a relatively stabilised market demand for R&D and innovation in a particular Member State or

industrial sector. Increment based incentives, which are probably more complicated to administer, are used where there is a policy objective to support dynamic firms or sectors. The two approaches can be combined in one tax incentive.

Although still less numerous than incentives aimed at reducing corporate taxation, tax incentives aimed at reducing the cost of employing research personnel are being increasingly used by Member States. These incentives seem particularly adapted where, in addition to boosting the level of R&D expenditure, there is a policy objective of increasing the number of employees engaged in R&D or when targeted firms are unlikely to make profits in the short term and could use upfront tax relief to carry out R&D activities. These incentives typically take the form of a reduced level of wage tax or social contribution charge for personnel directly involved in research and development activities. Other incentives can offer tax advantages aimed at reducing the cost of research personnel (e.g. in the form of reduced rates of personal income tax or reduced personal income tax base). In many Member States individual or corporate donations to foundations funding or undertaking R&D are tax-deductible.

3.1.4. Types of relief

In designing R&D tax incentives, the three basic types of tax relief are tax deferral, tax allowance and tax credit (in the form of actual tax / cash refunds). A tax deferral is a delay in the payment of taxes, which typically takes the form of accelerated depreciation. In principle, certain forms of tax deferral exist in the tax treatment of R&D in nearly every Member State. Most Member States accept full deduction of current R&D expenses, which can be regarded as accelerated depreciation.

If a Member State decides not to allow taking the full cost of R&D expenditure to the fiscal profit and loss account, the cost should usually be capitalized and depreciated over a period of time. In certain cases, a tax allowance is available where more than 100% of actual R&D expenses are deductible; the part of the deduction in excess over the actual R&D expenses can be considered the amount of the tax allowance. At present in the EU this form of allowance is available in half of the incentives.

When an incentive is given in the form of a tax credit, usually the credit is given on the amount of tax payable, thereby reducing the amount of tax actually paid.

3.1.5. Level of generosity

The generosity of R&D tax incentives seems to vary considerably across Member States (table 1). Although it is not easy to measure in a form suitable for cross-country comparisons, the level of generosity can also be measured by the β index[15] (the present value of before-tax income necessary to cover the initial cost of R&D investment and to pay corporate income tax[16]), and the effective cost of research activity, measured as percentage of the actual R&D expenditure. It is influenced by the overall corporation tax rate as well as the level of the tax relief. See below a comparison of different national schemes. Irrespective of the form which

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15 The β index is defined as the present value of before-tax income necessary to cover the initial cost of R&D investment and to pay corporate income tax, so that it becomes profitable to perform research activities. It is a unique tool to compare the generosity of the tax treatment of R&D in different countries.

16 See http://hermia.sourceoecd.org/vl=3120758/cl=14/nw=1/rpsv/scoreboard/a12.htm

the tax incentives takes, there is an obvious need for Member States to set a rate which is both sufficiently attractive and sustainable in the long run.

Table 1: Rates of tax incentives for R&D (caps not included)

	Based on volume of R&D	**Based on Increment of R&D**	**Rate of tax subsidies for USD of R&D, large firms, 2004.**[17]	**Rate of tax subsidies for USD of R&D, SMEs, 2004.**[16]
R&D tax credits*	France (10%)	France (40%)	0.134	0.134
	Ireland (0-20%)	Ireland (20%)	0.049	0.049
	Netherlands (14-42%)	-	0.021	0.113
	Norway (18-20%)	-	0.207	0.232
	Portugal (20%)	Portugal (50%)	0.283	0.283
	Slovenia (10-20%)	-	-	-
	Spain (30%)	Spain (50%)	0.441	0.441
	Turkey (40%)		-	-
R&D allowances**	Austria (125%)	Austria (135%)	0.112	0.112
	Belgium (113.5-120.5%)	-	-0.011	-0.009
	Denmark (100-150%)	-	0.178	0.178
	Hungary (200-300%)	-	0.162[18]	0.162[17]
	Malta (135-200%)	Italy (130%)	Italy (-0.027)	Italy (0.451)
	United Kingdom (125-150%)		0.96	0.106

Source: Report by IPTS – March 2005

* R&D tax credits are a company tax relief which can either reduce a company's tax bill or, for some small or medium sized companies, provide a cash sum. The R&D tax credit is stated as a percentage of the amount of tax payable.

** The R&D allowance is the amount of R&D expenditure which can be deducted from the actual amount of expenditure incurred, for the purpose of ascertaining the total taxable. The R&D allowance is stated as the combination of 100% of the actual R&D cost which is deductible plus the additional deduction which is a percentage of the actual R&D cost.

17 Data from OECD

18 The β index for Hungary is based on the 100% R&D tax allowance for research and technology development (which also applies to subcontracted R&D if the partner is a public or non-profit research organization). A 300% allowance is available if the company's R&D laboratory is located at a university or public research site; the β-index in this situation equals 0.666.

3.1.6. Eligible R&D costs

When designing an R&D tax incentive Member States determine which R&D activities and costs are eligible for the incentive. Three general types of costs can be distinguished: wages and social charges; other current expenses; and capital expenditure. Most Member States use the OECD definition of R&D[19] in their R&D tax incentives.

Most Member States allow for full deduction of current expenses as part of the general tax treatment of R&D. Most tax incentives are based on relief for R&D current expenses covering mostly costs for personnel and related expenses. About half of the tax incentives in the EU allow for certain types of R&D-related capital expenditure to be deducted, usually infrastructure and equipment. This type of costs, which typically constitutes about 10% of all R&D expenditures, is usually only partly deductible as it qualifies as investment in fixed assets which should be capitalised and subject to an appropriate rate of depreciation.

3.2. Good practices in different types of context

The above description of the various options for designing R&D tax incentives and improving the overall tax treatment of R&D raises the question of optimising design features in different national contexts, taking into account economic factors and policy priorities of Member States. Where there is no single approach to address all situations, the objective of stimulating business R&D is probably best achieved through a combination of complementary and well-balanced public support measures and framework conditions. Moreover, favourable R&D tax treatment is only one component of the overall policy mix which Member States use to promote business R&D.

The large majority of R&D tax incentives in the EU are general measures (non selective), associated in many cases with a cap per firm per year**.** About one third of these incentives provide specific benefits for SMEs, but very few currently are strictly targeted at SMEs. A large majority of R&D tax incentives are related to corporate tax while other design options target wage tax and social contributions, or personal income tax. The latter design options decrease with almost immediate effect one of the most important R&D cost components, i.e. research personnel wages. For targeting loss-making firms, such as young innovative SMEs, design options range from wage tax exemption to corporate tax refund or unlimited carry forward of losses incurred for future corporate tax relief.

With regards to the form of tax incentives within the EU Member States, about half are based on tax allowance; and the other half on tax credit.

3.2.1. Consideration of policy mix in designing tax incentives

In principle, the utility, scope and level of tax incentives will vary according to the Member State's specific conditions on the existing industrial structure and level of business R&D, macroeconomic situation and overall tax environment. In this context it seems clear that every Member State would choose a specific mix of public financing instruments to promote business R&D comprising of direct measures, risk capital measures, guarantees for loan and equity financing as well as tax measures.

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[19] Frascati Manual 2002, OECD

On the basis of the information available is seems that there is a greater potential for tax incentives in the form of corporate tax relief where the effective corporate tax rate is relatively high and where the level of business R&D is low. The same applies to the reduction of wage tax and social contributions where those are relatively high. The specific conditions in the Member State and policy objectives will indicate the most appropriate type of tax incentive for the given situation.

Irrespective of the mix of government support chosen by a Member State it should be ensured that the total system of government funding for business R&D is coherent and transparent and fit well together into one consistent approach. In this respect, the following questions might be relevant for Member States when deciding on a policy mix:

- If the objective is to increase the R&D intensity of firms from a relative low level, it might be sensible to use tax incentives as a general instrument for all firms by reducing their marginal costs on R&D;

- If the objective is to increase R&D intensity among SMEs, tax incentives are more likely to reach a larger group of firms;

- If the objective is to support well-identified, specific R&D activities or to stimulate specific high risk projects, direct measures are a more efficient tool because of their more targeted focus.

3.2.2. Generally R&D friendly tax environments

In principle, the first, most important, step in tax policy towards achieving R&D goals is to provide a general tax system which is research-friendly, such as in some of the highest R&D spending Member States. The most commonly noted elements of such R&D friendly tax systems are full deductibility for all R&D expenses (no capitalisation or accelerated depreciation of these expenses), adequate carry-forward and carry-back provisions for losses incurred or even the general statutory tax rate. However, if a Member State is not in a position to manoeuvre in the general tax system on the basis of legal or budgetary constraints, then a less generous approach in the form of R&D tax incentives could be considered.

Conversely, R&D tax incentives are less pertinent in Member States where the objective is to simplify the tax code by reducing allowances, broadening the tax base and lowering the statutory and effective rates of corporation tax.

3.2.3. Tax incentives supporting Young Innovative Enterprises (YIE)

Experience indicates (e.g. France, Netherlands) that special provisions for researchers and experts, based on reduced social contribution charges and wage taxes have had a positive effect on R&D, especially for highly innovative SMEs[20]. This type of incentive, however, could also be used by any enterprise in a sector experiencing skill shortages, regulatory or other structural disincentives to performing research in Europe.

In 2004, France became the first European country to introduce a tax incentive supporting specifically Young Innovative Enterprises (hereafter: "YIE"). The aim of the incentive is to stimulate private sector research and create real growth in just a few years by lowering the

[20] Annual Innovation Policy Trends and Appraisal Report, FRANCE, 2004-2005

costs of starting a new business oriented towards research and innovation, thereby increasing the rate of investment in research across all technology sectors. The tax incentive includes a corporate tax exemption for the first three profitable years and a subsequent tax exemption of 50% for the next two years. Furthermore the incentive offers a tax exemption on social security payments associated with the employment of highly qualified personnel for an 8 year period. In 2006, Belgium introduced a somewhat similar scheme.

In the French YIE scheme, eligibility criteria include fulfilment of the EU definition of SMEs, firm's age (younger than 8 years), R&D expenses (corresponding to at least 15% of total costs), and an obligation to execute R&D projects covering at least one of the three research stages defined in annex 1 to the Community Framework for State aid for R&D.

Special provisions for researchers

Several Member States have introduced tax incentives aimed at reducing the cost of employing research personnel. These incentives are used where a policy objective includes the need to increase the number of researchers. The specific benefit of such an approach is that targeted firms use upfront tax relief to carry out R&D activities. These incentives typically take the form of a reduced level of wage tax or social contribution charge for personnel directly involved in R&D activities. These incentives are directly beneficial to the enterprise engaged in the research. The new framework for State aid for research and innovation foresees the possibility of similar treatment for other categories of qualified staff in SMEs, with a view to encourage innovation. Other incentives can offer tax advantages at the level of individuals or firms supporting research through donations. In many Member States individual or corporate donations to foundations which fund or undertake R&D are tax-deductible.

Whereas incentives based on reduced social contribution charges and wage taxes are particularly effective to boost business R&D in highly innovative SMEs, this type of incentive could also be used by all types of enterprise in sectors experiencing skill shortages and regulatory or other structural disincentives to performing research in Europe..

4. GUIDELINES FOR EVALUATING R&D TAX INCENTIVES

Relatively few tax incentives have been evaluated, due partly to their relative novelty and lack of the necessary data. These evaluations were mostly of an econometric nature and mostly attempted to estimate the direct additionality of the incentive, i.e. the extent to which the resulting increase in business expenditure on R&D exceeds the tax revenue foregone. However, additionality is only an intermediate indicator of the overall impact of an R&D tax incentive which should ultimately result in increases in productivity gains and economic growth. Moreover, these evaluations were carried out using different methodologies, making results incomparable.

Given the severe lack of data and thorough evaluation of existing R&D tax incentives, it is only possible at this stage to offer the type of general guidance on how to design and implement R&D tax incentives outlined in section 2.1.

This situation led the CREST Expert Group on Fiscal Measures to look in detail at evaluation methods for R&D tax incentives and to produce a Handbook overviewing issues and considerations for the benefit of public authorities planning future evaluations. CREST

endorsed the published outcome of this CREST expert group and commended the content therein to the Council and the Commission.

4.1. Evaluation approaches

The evaluation of the effectiveness of R&D tax incentives can take place ex-ante, i.e. estimating beforehand their expected outcome, or ex-post, and follow different approaches:

- Estimating ex-ante or ex-post the size of three kinds of impact: the increase of R&D within firms; the improved economic performance of firms; and the benefits for society at large.

- Describing ex-post how state support influenced firms: directly through increased R&D, indirectly through increased R&D capacity that eventually causes increases in R&D, and finally through behavioural additionality, i.e. change in attention and behaviour that in turn causes increases in R&D.

There is little doubt that an increase in R&D has important benefits for society as a whole, and that an increase in R&D for firms overall will lead to increases in innovation and productivity. However, these so-called third order (benefits for society at large) effects are hard to determine through evaluations of a particular measure in isolation, because so many other factors contribute to changes in productivity. Policy makers are also advised to be aware of this limitation, and to focus foremost on first order (additionality) and second order (firm economic performance) effects when evaluating tax incentives.

It usually takes several years before a tax incentive's full potential of additionality is reached, and even more years before this transforms into improved economic performance, such as increased profits. In highly competitive industries, R&D might not lead to higher profits, but is necessary in order for firms to stay in business.

4.2. Recommendations

The following recommendations are made to policy makers involved in the design, implementation and evaluation of R&D tax incentives. They are largely drawn from the conclusions presented in the Evaluation Handbook prepared by the CREST Expert Group[21].

- The aims and objectives of R&D tax incentives should be very clearly defined, as a prerequisite to their proper evaluation.

- Evaluation of tax incentives should foremost:

    - Focus on ascertaining the direct additionality of tax incentives, i.e. the degree to which they induce more R&D activities (over and above what would have taken place otherwise) and improve economic performance of beneficiary firms.

    - Estimate behavioural additionality, i.e. the degree to which they induce changes in firms' strategic behaviour and internal decision-making with regards to R&D and innovation.

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[21] Handbook on the Evaluation of R&D tax incentives, 17 March 2006

    - Test whether tax incentives have met their specific objectives and whether their delivery/administration mechanism was efficient.

- The wider societal effects of tax incentives should also be evaluated, but preferably in the broader context of the policy mix supporting investment in research and innovation, i.e. the combination and interaction of the range of policies affecting human resources in S&T; the science base; the performance of business R&D and innovation; and the overall economic and market development in each Member State.

- Tax incentives should be evaluated using a variety of different and complementary methods, aimed not only at estimating their impact but also at estimating their efficiency and administration costs.

- When designing R&D tax incentives, policy makers should already clearly identify which data will be needed for their evaluation, and how to collect these data. Particular attention is drawn to the fact that these data should allow counterfactual analysis when estimating direct and behavioural additionality, through the individual or combined use of historical data, data collected during discontinuities in the operation of the tax incentives and comparable data from other countries.

- Careful attention should be given to the independence of evaluators and evaluation processes, whose results should be published and used to inform policy improvements.

The Commission will endeavour to monitor and analyse the results from different national evaluations in order to improve and feedback on the general understanding of the effectiveness of R&D tax incentives. This could serve as input to further mutual learning in the context of OMC-3%.

5. ANNEX I: SUMMARY OF GENERAL PRINCIPLES

- incentives should be transparent and easily accessible to a broad range of firms;
- the nature and basis of incentives should not change too frequently.

General versus selective measures

- general measures are best used to reach more firms, maximising the potential increase in BERD and minimising market distortions;
- targeted measures are best used to reinforce technological leadership or build critical mass, but must be carefully designed to avoid distortion of the market.

Types of regime

- where there is a relatively stable market demand for R&D, volume based incentives are best used;
- where there is a specific policy objective to support dynamic firms, increment based incentives are best used;
- both approaches can be combined in one tax incentive.
- to increase the number of employees engaged in R&D or to support firms which are unlikely to make profits in the short term, tax incentives to reduce the cost of employing research personnel are particularly apt.

Types of relief

- the full cost of R&D expenditure should be capitalized and depreciated over a period of time if it is decided not to allow taking the full cost of R&D expenditure to the fiscal profit and loss account.

Level of generosity

- a rate should be set which is both sufficiently attractive and sustainable in the long run.

Eligible R&D costs

- R&D current expenses (eg personnel costs) should be fully deductible as part of the general tax treatment of R&D;
- make certain types of R&D-related capital expenditure (eg infrastructure and equipment) at least partly deductible.

Evaluation

- focus on ascertaining the direct additionality of tax incentives and their behavioural additionality;

- test whether tax incentives have met their specific objectives, whether their delivery/administration mechanism was efficient and their wider societal effects;
- use a variety of different and complementary methods, estimating impact, efficiency and administration costs;
- when designing R&D tax incentives, clearly identify which data will be needed for their evaluation, and how to collect these data;
- ensure the evaluators and evaluation processes are independent and publish the results.

6. ANNEX II: EMPIRICAL EVIDENCE ON THE USE AND EFFECTS OF R&D TAX INCENTIVES

6.1. Introduction

In 2006, the Commission launched a survey on the use and effects of the major tax incentives for R&D activities across Europe. The evidence was collected through consultation of the member firms of the European Business Test Panel (EBTP).

Tax incentives were defined as incentives that offer benefits for financing R&D activities above the standard tax treatment for investment in general. The study investigated volume-based, incremental, and project-specific incentives. The study distinguished between different types of R&D tax incentives: tax treatment under corporate tax law (tax allowance and tax credit), and schemes based on employers' share of wage tax and social contributions.

The surveyed sample was composed of two hundred one firms, out of which forty-one declared using R&D tax incentives. Although these samples are not representative, the study still provides useful information on the preferences and frequency of use of tax incentives, and gives insight on the impact of such incentives on R&D activity in firms.

6.2. Profile of the firms using tax incentives for R&D

In the surveyed panel, the majority of firms that did not use tax incentives were based in countries that do not offer such schemes. Among firms based in countries where tax incentives were available, more than half did not use tax incentives (see table 1).

The obtained evidence indicates that in the surveyed panel, tax incentives were used mostly by large firms[22] with an important international presence, active in R&D intensive manufacturing sectors. This could be explained under two hypotheses.

The first one relates to the characteristics of R&D activities. One explanation of the predominance of manufacturing firms among those using tax incentives may be a high concentration of formal R&D in the sector. Also, the definitions of R&D eligible for tax incentive support may cover mainly the type of research activities performed in manufacturing firms. Consequently, the type of research conducted by some of the firms that do not use tax incentives may not fall under the category of R&D activities eligible for tax incentive support.

[22] employing over 500 employees

Second, the significant share of large firms among those using tax incentives for R&D could lead to a hypothesis that scale plays an important role in offsetting the compliance costs of using such incentives. On the one hand, the commitment of human and material resources to administration of firms' participation in tax incentive schemes may be offset when the benefits of participation can be spilled over many projects. On the other hand, the benefits from using such incentives may outreach costs of getting involved in these schemes especially when applied to more expensive research projects.

Regrettably, due to technical problems, it was not possible to investigate the reasons of non-using of tax incentives for R&D.

6.3. Tax incentives for R&D and localisation of R&D centres

In the majority of cases, the availability of tax incentives did not significantly influence the decision on localisation of R&D centres of the surveyed firms.

Indeed, the gathered evidence points out that tax incentives alone were not the major factor influencing the localisation of R&D activities. Specifically, in case of the surveyed firms, availability of tax incentives in their country of origin did not exclude the decision on localising of their R&D activities abroad, even in countries where tax incentives for R&D are not available. This does not exclude that the availability in a country of tax support, accompanied by other favourable conditions, might attract firms to locate there their R&D activities.

6.4. Nature of incentive-driven R&D

Tax incentives-driven R&D was mainly in the core area of the surveyed firms' work. This indicates that tax incentives reinforced rather than induced changes in business strategies, although in the case of fourteen firms it always or very often encouraged high-risk, long-term research projects.

6.5. Type of the mostly used tax incentives

Tax allowance-volume-based incentives, reduction on wage tax and social security contributions and tax allowance-project based incentives were three mostly used incentives. A relative importance of the reduction on wage tax and social security contributions may be influenced by a relative high number of answers referring to R&D centres located in countries that make such a scheme available.

Answers on preferences of using a specific incentive rather than others among firms that used more than one incentive showed that firms preferred tax-allowance volume-based incentive regardless of their size, sector of operation or location of R&D centre.

While some of the surveyed firms used two types of tax incentives, none used more.

6.6. Effects of the use of tax incentives for R&D

The impact of tax incentives on R&D activities relates to short- to medium-term. The obtained results confirm earlier studies on the input additionally of tax incentives, indicating that the majority of the surveyed firms that made use of tax incentives has increased their R&D expenditure by amounts greater than the net benefit available from the use of incentives.

The impact of the tax incentive-driven R&D on the surveyed firms' value added and competitiveness was major or somewhat important. However, its impact on the surveyed firms' productivity was moderate.

Sometimes tax incentives allowed increasing R&D employment and R&D networking, financing sub-contracted research and making capital investments, financing overheads, buying materials and making additional training. More rarely, they also allowed increasing R&D wages and salaries and finance filling and purchasing of patents and licenses.

The relative importance of tax incentives for conducting R&D was smaller in comparison to such factors as market conditions and access to R&D personnel. On the other hand, it was rather comparable to access to R&D-related infrastructure, access to private financing and access to direct government support. It is however interesting to note that the majority of firms that used both tax incentives and direct support (17 firms) indicated that the latter allowed to spend more on R&D than in case of the use of tax incentives.

The analysis of the impact of the three mostly used incentives, i.e. tax-allowance-volume-based, reduction on wage tax and social security contributions, and tax allowance - project-based incentives was performed on relatively small samples of 12, 8 and 9 firms respectively and as such does not provide conclusive evidence.

The design of tax-allowance-volume-based incentives used by the surveyed firms responded well to the objectives that are generally set for that kind of tax support as it constructively served firms in intensifying their R&D activity. Specifically, in the majority of cases, the increase of R&D spending resulting from the use of the incentive was greater than the net benefit received under that scheme. Also, this type of incentive had a rather important impact on firms' productivity, value-added and competitiveness.

As regards the reduction on wage tax and social security contributions, the surveyed firms believed that it led to the increase of their competitiveness. They did not observe, however, any recent increase of R&D spending, nor any important impact on other areas related to their R&D and overall performance.

Finally, as regards the tax allowance - project-based tax incentives, the obtained results indicate that although firms believe that such incentives had impact on their competitiveness and value-added, this impact was not very important. Also, only half of the firms that claimed using this type of incentive within the three years prior to the survey date experienced a recent increase of R&D spending. It can be thus concluded that in the case of the surveyed firms, reaching such objectives as increasing of R&D activities or business R&D spending may be more difficult and/or may take longer time when using the two latter types of incentives, in comparison to the first one.

Table 1: Main characteristics of the surveyed firms

	NUMBER OF ANSWERS	SAMPLE SHARE (%)	NUMBER OF ANSWERS	SAMPLE SHARE (%)	NUMBER OF ANSWERS	SAMPLE SHARE (%)
	FIRMS THAT DO NOT USE TAX INCENTIVES REGARDLESS OF THE AVAILABILITY OF THE INCENTIVES IN THEIR COUNTRY OF LOCATION (N=142)		FIRMS THAT DO NOT USE TAX INCENTIVES AND THAT ARE LOCATED IN COUNTRIES WHERE TAX INCENTIVES ARE AVAILABLE (N=56)		FIRMS THAT USE TAX INCENTIVES (N= 41)	
COUNTRY						
TAX INCENTIVES AVAILABLE	56	39,4	56	100	41	100
TAX INCENTIVES NOT AVAILABLE	86	60,6	0			
MAIN SECTOR OF ACTIVITY						
MANUFACTURING	43	30,3	19	33,9	22	53,7
REAL ESTATE, RENTING AND BUSINESS ACTIVITIES	21	14,8	7	12,5	6	14,6
TRANSPORT, STORAGE , COMMUNICATION	12	8,5	2	3,6	4	9,8
CONSTRUCTION	15	10,6	7	12,5	3	7,3
WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES, MOTORCYCLES AND PERSONAL AND HOUSEHOLD GOODS	14	9,9	8	14,3	2	4,9
FINANCIAL INTERMEDIATION	2	1,4	2	3,6	2	4,9
OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICE ACTIVITIES	13	9,2	4	7,1	1	2,4
MINING/QUARRYING	4	2,8	1	1,8	0	0,0
ELECTRICITY, GAS AND WATER SUPPLY	9	6,3	2	3,6	0	0,0
HEALTH AND SOCIAL WORK	8	5,6	4	7,1	1	2,4
HOTELS, RESTAURANTS AND BARS	1	0,7	0	0,0	0	0,0
TOTAL	142		56	100	41	100
NUMBER OF EMPLOYEES						
0	6	4,2	1	1,8	1	2,4
1-9	25	17,6	9	16,1	4	9,8
10-49	21	14,8	10	17,9	6	14,6
50-249	34	23,9	16	28,6	7	17,1
250-499	15	10,6	6	10,7	4	9,8
500 +	41	28,9	14	25,0	19	46,3
TOTAL	142		56	100	41	100
NUMBER OF EU COUNTRIES IN WHICH THE FIRM REGULARLY SELLS PRODUCTS AND SERVICES, OTHER THAN THE COUNTRY OF ORIGIN						
NONE	36,2	35,7	19	35,8	8	19,5
1	8,7	8,6	6	11,3	1	2,4
2-3	20,3	20,0	11	20,8	6	14,6
4-5	4,3	4,3	3	5,7	7	17,1
MORE THAN 5	30,4	30,0	14	26,4	19	46,3
TOTAL	138		53	100	41	100
NO ANSWER*	4	2,8	3	5,4		
CORPORATE STRUCTURE						
INDEPENDENT	60,3	55,6	28	56,0	17	41,5
PARENT FIRM	18,3	16,9	10	20,0	8	19,5
SUBSIDIARY OF ANOTHER FIRM LOCATED IN ANOTHER COUNTRY	11,5	10,6	7	14,0	10	24,4
SUBSIDIARY OF ANOTHER FIRM LOCATED IN THE SAME COUNTRY	9,9	9,2	5	10,0	6	14,6
TOTAL	131		50	100	41	100
OTHER*	11		6	10,7		
RATIO OF R&D EXPENDITURE TO TURNOVER						
NONE	2	1,5	1	1,8	0	0,0
FROM 0 UP TO 1 %	55	40,1	22	39,3	13	31,7
FROM 1 UP TO 3 %	41	29,9	22	39,3	12	29,3
FROM 3 UP TO 7 %	13	9,5	4	7,1	5	12,2
FROM 7 UP TO 10 %	12	8,8	0	0,0	3	7,3
MORE THAN 10 %	14	10,2	7	12,5	8	19,5
TOTAL	137	100	56	100	41	100
NO ANSWER*	5	3,5				

* For analytical purposes, "do not know", "other", and missing answers were not taken into account in data analysis. However, to indicate the frequency of such answers, their percentage to the total of respondents per sample has been additionally calculated. Source: survey data