

Promoting innovation by tax incentives

A review of strategies and their importance to
biotech growth



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Foreword

Biotechnology and the life sciences are creating growth and health benefits based on research discoveries. The industry is characterised by long development times, and large investments are needed before profits are reached. Several countries have adapted their tax system to stimulate the development of innovative companies with high R&D expenditure, such as biotechnology companies. Tax incentives for R&D stimulate the growth of innovative companies by lowering the effective cost of investment in R&D. The majority of OECD countries provide tax incentives for R&D in the private sector and the measure is becoming increasingly popular.

This report provides an overview of tax incentives for R&D as they exist today. More specifically, it presents a thorough comparison of the tax incentive programs that are presently in place in four countries: Canada, France, Norway and the UK. The report will hopefully give guidance in implementation of tax incentives in other countries, with a view to supporting the development of biotechnology companies and R&D-intensive companies in other industries.

The report was prepared as one part of the project "Realisation of Young Innovative Company status, YIC, for biotech companies" supported by the European Commission (Contract No. LSSB-CT-2005-018768). It is the result of collaboration between national biotech organisations in five countries: Estonia, Finland, France, Norway and Sweden. EuropaBIO is the sixth member of the consortium.

Introduction

Biotechnology is widely recognised as a key industry for future growth, as the current explosion in knowledge related to life sciences is creating a stream of opportunities for companies to explore. The development promises continued growth, paralleled by health benefits in terms of new medicines. It is no wonder that, in times when traditional jobs are under cost pressure, governments worldwide are looking to biotechnology with favourable eyes.

Biotechnology and the life sciences as a whole is not a “bubble industry”. The rapid increase in knowledge related to life science is indisputable. With an ageing population and diseases with no current cure, the market is real. Genentech, Amgen, Serono and many other corporations have shown that it is possible to create large and profitable biotechnology companies from scratch even though profits may seem far off during the first ten years. The sector is now maturing, and Ernst & Young believes that the publicly traded US biotechnology companies could well reach aggregate profitability in 2008 (Ernst & Young, 2006). There is no reason why Europe could not do just as well. However, catching up requires a consistent strategy which concentrates on reducing key challenges to biotech growth.

Financial constraints constitute the main challenge to a growing biotechnology sector. Companies have long and expensive development times, and taking a medical drug from conception to the patient stage may take 10–20 years and require a billion Euros. As companies rarely earn money before a product has been developed, they must rely on external funding from venture capitalists or through the stock market. The demand for venture capital is much greater than the supply. This is particularly true of Europe, where the average VC investment in high-tech companies is nine times less than in the US (European Commission, Key Figures, 2005).

A key European concern must be to improve the environment for young innovative companies to grow. This message is not new, and has been repeated over and over again during the Lisbon process. It is vital to secure early-stage funding, to provide small business grants and to offer an overall growth-friendly tax environment in which venture capitalists, business angels and companies feel comfortable with investing. Giving tax incentives for R&D is one attractive strategy that can efficiently stimulate investment in R&D companies with a minimum of market distortion and bureaucracy.

Tax incentives for business R&D

Tax incentives for business R&D are widely regarded as an important policy tool to stimulate private investment in biotechnology and in innovation in general. OECD reports that in 2005, 70% of member countries had tax incentives for R&D investments in place, including the US, Canada, Japan and Australia (OECD, 2006). The figure compares to only 50% of OECD countries in 1996, highlighting the growing popularity of this policy instrument. Many countries have special provisions that also allow unprofitable research companies to benefit from the incentives through tax relief or reduced social costs. Such concessions are particularly important for biotechnology companies, as cash-flow is often a problem many years after they are formed.

Several European states have introduced fiscal incentives for R&D. In France, R&D tax credits have existed since the 1980s, but the Young Innovative Company system launched in

2004 meant a decisive shift in policy towards a much more friendly tax environment for the most innovative firms. The UK has implemented a different system which also concentrates mainly on small and medium-sized enterprises (SME¹). Belgium, the Netherlands, Ireland and Norway are other examples of countries that have implemented fiscal incentives for business R&D; these all have their own specific profile.

The common rationale behind fiscal incentives for R&D is to increase industrial investment in R&D by lowering the cost of such investments. However, the different countries have chosen strikingly different strategies to achieve a common goal. It is important to gain an overview of the practices that function best in order to (1) improve existing systems, and (2) guide countries that have not yet put fiscal incentives into practice.

This document first puts tax incentives for R&D in a broader context and considers the main reasons for introducing them. Overall design issues are discussed in order to clarify the different types of tax incentives in use. The main part of the document, however, compares tax incentives for R&D in four countries: Canada, France, Norway and the UK. These four countries were chosen because they represent four different strategies and implementations of tax incentives. Consideration of their practices and results should hopefully be helpful to policymakers working on novel programs for R&D tax incentives.

¹The European Commission defines the category of micro-, small- and medium-sized enterprises (SMEs) as being “made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million” (European Commission, The New SME Definition, 2005)

Why should governments support business R&D?

There is widespread agreement that R&D investments are beneficial to society. It is also recognised that governments can catalyse a positive development by stimulating business R&D. The four factors listed below are strong arguments in favour of supporting business R&D through tax incentives.

- Overcome a market failure in early stage financing
- Promote growth
- Create high-quality jobs
- Health benefits

Market failure. Industry invests less in R&D than would be optimal for society as a whole (*Figure 1*). The reason for this market failure can be broken down into two factors: R&D spillovers and information asymmetries in early-stage funding.

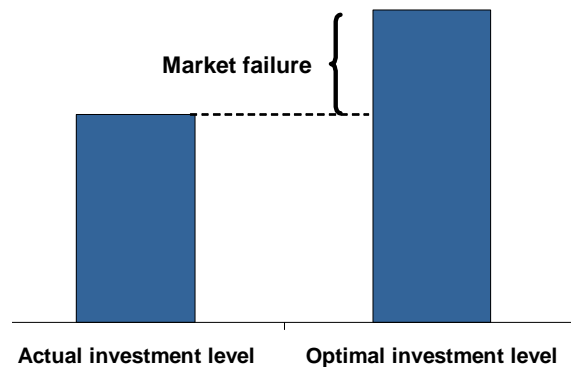


Figure 1. Actual industrial investments in R&D are lower than would be optimal to society

- *R&D spillovers* happen as the knowledge generated within a company spreads to other businesses and industries. One example is generic drugs: although the original innovator is protected for some time, others will catch up as patents expire and they reap part of the benefits from the R&D. Because companies do not themselves get the full benefit of the R&D investments, they will spend less on R&D than is optimal for society as a whole. Empirical evidence shows that the spillover effect exists and that the returns to society from an increase in a company's R&D outlays are 2–3 times greater than the returns to the company itself (Griffith, 2000).

- *Information asymmetries* exist when one party has more information than the other. In general, early-stage biotechnology companies perform very advanced research and investors can only rarely determine the exact R&D status, and the potential and likelihood of success. Lack of information increases the risk and reduces the investor's desire to fund the company. Research intensive SMEs within high-risk sectors such as biotechnology are likely to be most hampered and will have difficulties in attracting external funding. At the same time, it is among such firms that we can often find tomorrow's technology leaders - given that they get the chance to grow.

R&D spillovers increase the optimal level of R&D investment, while information asymmetries reduce the actual level of R&D spending. Together, this creates a financial gap between actual R&D spending and the optimal level, a gap that is most severe for fledgeling R&D companies. The goal of tax incentives is to reduce this gap by lowering the cost of investing in R&D.

Growth. Economies are becoming increasingly driven by innovation. There is a strong connection between R&D investments in a country and growth. However, one effect of globalisation is that large companies mainly grow outside their original home country. It is crucial that young and middle-sized R&D companies pass from being promising to becoming

new sources of growth and job creation. By spurring R&D investments, governments can promote this development.

Job creation. Many countries have invested heavily in education, resulting in a current surplus of people with a science education and possibly even a Ph.D. In Sweden, the number of research students obtaining a Ph.D. degree in medicine increased by 90% between 1991 and 2001 (Enerbäck *et al*, 2004), and the number of masters students in biotechnology has grown in a similar fashion. These recent investments in human capital are not being met with similar efforts to create a growth-friendly climate for potential employers. The current surplus of talent in biotechnology represents an enormous waste of human resources. Fiscal incentives for R&D are strictly oriented to promote business growth and can be specifically tailored to create new job opportunities.

Health benefits. Advances in our knowledge in the medical and bioscience fields are happening at an ever-increasing rate. Even so, large investments are needed to transform research findings into products and better health. By promoting private investment in innovative life science companies, tax incentives for R&D will have the indirect effect of improving public health in the long term.

Designing tax incentives

Policymakers need to invest time and effort in designing tax incentives for R&D in order to create the desired effect and to avoid bureaucracy. There are many potential trade-offs that must be considered. One involves the challenge of creating a simple and transparent system while at the same time targeting resources to the sectors in greatest need of incentives.

The architectures of the tax incentives that are currently being implemented are strikingly different. Governments may have chosen different strategies because of differences in goals, industry structure and general tax environment. However, programs can also vary considerably between countries with seemingly similar objectives. It is important to take a lesson from the best practices currently in place, in order to improve existing schemes and to avoid mistakes in designing new programs.

Based on policy documents, papers and discussions with industry representatives, five characteristics have been identified which any tax incentive program should possess:

- **Generous** enough to influence investment decisions
- **Predictable** enough to enable long-term investment planning based on the incentives
- **Simple** enough to ensure that companies understand the programs
- **Low administrative burden** to encourage even small companies to claim the benefits
- **A clear targeting profile** to concentrate resources to where they have the greatest effect

We will return to these five parameters later in the text. However, it is good to keep them in mind through the next section, which discusses the main design alternatives available to the policymaker.

Allowances, credits or other support alternatives

Tax incentives for R&D are most often available in the form of an allowance, or as a credit. A less distinct category of support measures can be grouped into what we will call “extended incentives”.

Tax allowances

Although R&D expenditure represents an investment for the future, almost all developed countries allow complete deduction of current R&D expenditure, such as costs of materials and salaries for researchers. A number of countries allow immediate or accelerated write-off of capital expenditure such as machinery (e.g. Spain, Denmark, Canada and Ireland) and other countries provide accelerated write-off for buildings associated with the R&D work (UK is one example).

More importantly, many countries provide tax allowances for R&D outlay. Companies investing in R&D can deduct the costs to above their actual value. This reduces the taxable profit and lowers the cost of the R&D investment. Australia, Austria, Belgium, Denmark and the UK are examples of countries that provide tax allowances. The value of these allowances for the company will depend on the level of income tax that the company is facing.

Tax credits

A tax credit is applied directly to the tax that is being paid. It is specified as a percentage of the R&D expenditure (e.g. 20% of R&D outlay) and this credit reduces the tax payable. An

important difference between credits and allowances is that credits do not depend on the level of corporate tax. Canada, France, Spain, Ireland and Norway are all countries that offer tax credits for R&D, and among the OECD countries, credits are generally used more often than tax allowances.

Extended incentives: cash payment and relief of social costs

Companies that are involved in R&D are often still many years away from profitability. This is particularly the case for newly established firms in the life science industry, with their long development times. Without profit, these firms do not gain from tax allowances and tax credits. Thus, although this group of companies is financially the most vulnerable, they do not benefit from the standard tools available.

Constructing incentives for unprofitable firms thus requires special solutions. One alternative is to allow companies to carry tax credits and allowances back or forward in time, to set against profits in better years. However, carrying a tax credit forward makes it less valuable since time erodes its value. It is important to realise that young R&D-intensive firms are more in need of immediate cash flow than of reduced tax bills in the future. To support these companies, some countries provide tax incentives through an immediate cash payment. This is current practice in Canada, France, the UK and Norway, for example, with variations in implementation.

Another option is to relieve the companies of social costs related to the R&D expenditure. Because unprofitable businesses also pay social costs for their employees, this measure provides general support to companies performing R&D. The main benefit of the YIC system, in place in France and Belgium, is relief from social costs. French companies qualifying for YIC status are exempt from paying social costs for all researchers and technicians, but also for employees in other roles such as managers and employees in charge of intellectual property and judicial matters.

Volume or incremental change as the basis of support

Volume or incremental change as the basis for calculating tax incentives is another issue. Fiscal incentives based on volume define the support as a percentage of the total amount of R&D that the company is undertaking. This can lead to a situation whereby governments support R&D that would also have been carried out without the incentives. To encourage an *increase* in R&D spending, some countries (e.g. France, the US and Spain) therefore base at least part of the support on the *increase* in R&D volume. The credit is calculated as a percentage of the year-to-year change in R&D expenditure.

Governments provide tax relief to increase R&D investments; thus, basing the support on the incremental volume change in R&D is appealing. However, the theoretical advantage must be weighed against the relative complexity of an incentive based on incremental change compared to one based on volume. A special solution is needed to handle a decrease in R&D costs. The tax relief may also be very volatile from one year to another in an incremental system, which creates uncertainty. Most countries therefore prefer a volume-based incentive program.

Targeted incentives

Many countries have decided to target tax incentives to SMEs and/or research intensive companies. The Young Innovative Company system in France, for example, targets young companies that devote at least 15% of their outlay to R&D. Belgium, the UK, Canada, the

Netherlands and Norway are other examples of countries that have a more generous treatment of SMEs than of larger companies.

Denmark and Norway provide incentives to companies that collaborate with public research institutes. The UK has a special tax incentive program targeting the development of vaccines for third-world diseases.

The rationale for targeted incentives is to give an extra boost to R&D investments in a specific category of companies. These companies may be particularly dear to policy makers or be more likely to suffer from market failures and information constraints that cause them to underinvest in R&D. Targeted incentives to SMEs are motivated by SMEs possessing the highest potential to generate future growth but being restricted by their financial instability and high risk, which makes it difficult to attract investors.

Qualifying R&D expenditure

The OECD has published recommendations on what should be defined as R&D (OECD, 2002). Most countries use these recommendations to specify qualifying R&D costs but there are many country-specific definitions—which results in differences in the generosity of the incentives.

Costs that qualify for tax incentives can be considered under the following categories:

- **Salaries.** Most countries include salaries and social charges for R&D employees in their tax incentives. The incentive reduces the cost of hiring research personnel and stimulates the business to invest in new job opportunities.
- **Current expenses.** Current expenses besides salaries include materials, fuel, power, software and much else related to the R&D.
- **Capital costs.** Some countries allow inclusion of capital costs related to R&D in calculating the expenditure.
- **Outsourcing of R&D.** Subcontracting of R&D activities and external salary costs are treated in different ways by tax incentive schemes.

Country benchmark

To highlight the different philosophies and designs of tax incentive systems, it is useful to compare existing approaches in detail. This section compares the systems in four countries: France, Canada, Norway and the UK.

These countries were chosen because they represent four distinct approaches to fiscal incentives for R&D. Learning about these four approaches should be helpful to any country considering introducing or improving tax incentives for R&D.

The generosity of tax incentives

All four countries see their tax incentive program as an investment that generates long-term benefits to society, in terms of new jobs and tax revenues. However, in the short term the programs give rise to costs through reduced tax streams and direct payments to companies in a negative tax position. The cost of the tax incentive program is a first approximation of the ambition and generosity in each country (*Table 2*).

Overall costs of tax incentives for R&D		
	Total cost (M€)	Total cost/capita (€)
Norway	204	44,4
Canada	1242	37,9
France	970	16,0
UK	557	9,2

Table 2. Overall costs of tax incentives. Figures are SwedenBIO estimates for 2006 based on costs communicated by the responsible authorities in each country.

Canada has the most generous tax incentive program in terms of absolute costs, followed by France, the UK and Norway. However, per capita, Norwegians invest the most in tax incentives, followed by Canadians.

A) Biotech start-up

- 2 years old
- No profit
- Investing €1 M. in R&D/year (25% increase)
- 80% of R&D-costs are salaries

B) Growing biotech

- 5 years old
- No profit
- Investing €3 M. in R&D/year (10% increase)
- 70% of R&D-costs are salaries

C) Profitable biotech

- 10 years old
- Taxable profit of €7 M
- Investing €5 M. in R&D/year (0% increase)
- 60% of R&D-costs are salaries

Figure 2. The three model companies used to illustrate the effect of tax incentives on companies in different phases of development.

The accumulated cost in each country does not tell much about the effect the incentives are having on R&D activities in any particular company. Such a comparison is not straightforward, as thresholds and differences in design blur the analysis.

To give an overall view, we will compare fiscal incentives based on their effect on three model companies (*Figure 2*). The companies have different amounts of R&D outlay, but each represents one potential claimant of incentives. Studying the generosity of fiscal systems towards each of them will help to give an overall picture.

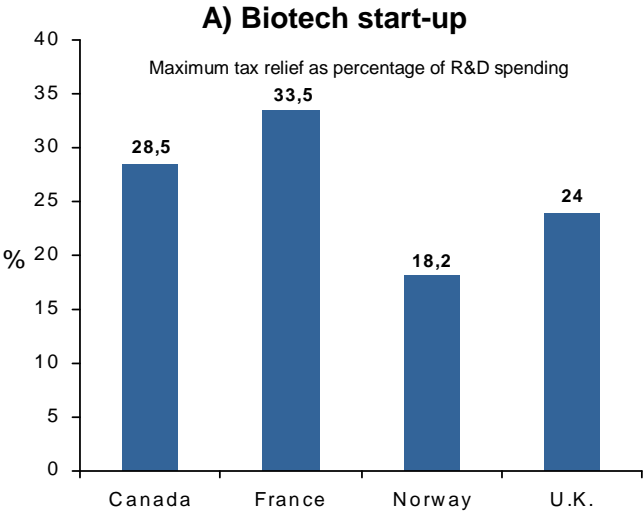


Figure 3. Tax relief as a percentage of R&D outlay for a biotech start-up company. All countries strongly support the start-up company, with France offering the best environment.

The first company is a 2-year-old biotech firm with R&D costs of 1 M EUR, increasing by 25% since the previous year (*Figure 3*). We assume that 80% of R&D costs are for employees qualifying for YIC status. All four countries would offer this company strong support. France offers the most favourable environment to this company, through reduced social costs and a refundable tax credit. Canada also gives a sizeable tax credit, and the UK and Norway are a little further behind. In fact, although Norway offers a tax credit of 18.2% of the total R&D costs, France is almost twice as generous.

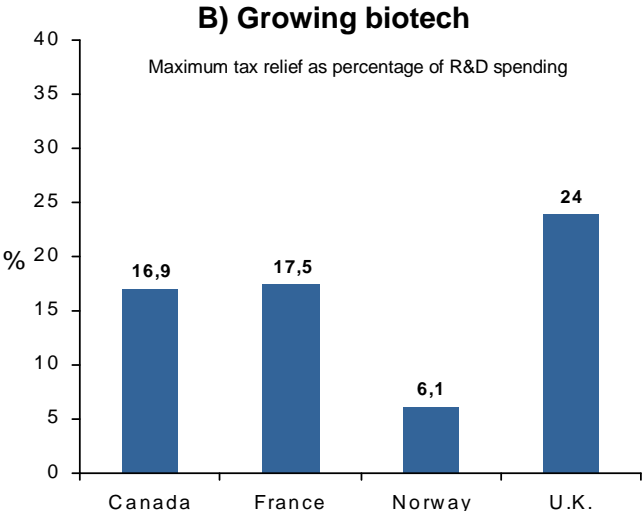


Figure 4. Tax relief as percentage of R&D outlay for a growing biotech company. Canada, France and the UK all stimulate growth, while Norway is much less supportive.

The second model company is 5 years old with R&D costs of 3 M EUR, increasing by 10% since the previous year (*Figure 4*). We assume that 70% of R&D costs are for employees qualifying for YIC status. All four countries, except the UK, would contribute less to the R&D costs of this company than they would to the smaller company in the first example. Norway would contribute the same amount in absolute terms, which reduces the support to

6.1% of R&D costs. The UK would refund the same percentage of R&D costs (24%), and this makes the UK the most favourable country for this model company. In France and Canada, the support would be about 17% of R&D costs.

The final example is a 10-year-old company with a taxable profit of 7 M EUR, re-investing 5 M EUR into R&D, which represents an increase of 10% (Figure 5). Canada, France and the UK all offer nearly identical support of close to 15% of R&D costs. Norway is far behind and covers only 3.6% of the total R&D costs.

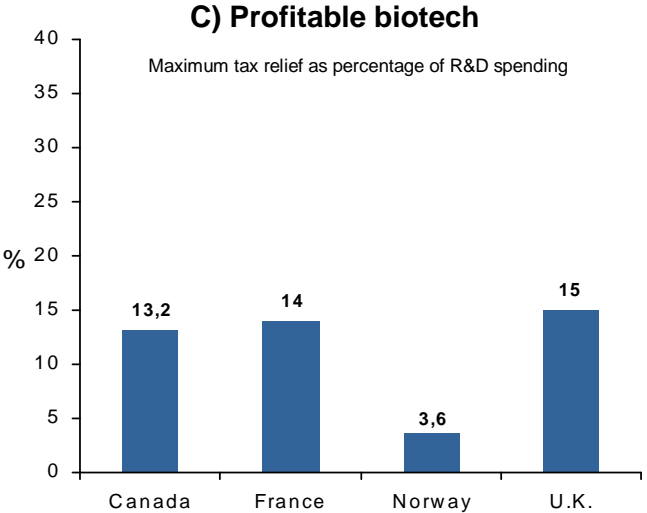


Figure 5. Tax relief as percentage of R&D outlay for a profitable biotech company. Canada, France and UK all have incentives of similar size. Norway only offers minor R&D support.

Details of Countries

Canada

Background

Canada was one of the pioneering countries in using tax incentives for R&D. The Scientific Research & Experimental Development (SR&ED) tax incentive program, introduced in the 1980s, is a federal program to encourage companies in general to increase their R&D outlay. Today, the SR&ED program is the largest source of federal support for industrial R&D (SR&ED homepage). In addition to the federal program, most provinces have supplementary programs. These will not be considered here.

Design of the tax incentive program

The SR&ED provides tax credit as a percentage of qualifying R&D expenditure. The companies that can claim the credit fall into three groups:

- Canadian-controlled private companies
- Other Canadian corporations
- Proprietorships, partnerships and trusts

The first group of companies, Canadian-controlled private companies, are treated most favourably and can claim a credit amounting to 35% of R&D expenditure up to 1.42 M EUR (2 M CAD). Additional R&D costs entitle the company to a credit of 20% of the investments. Other Canadian corporations can claim a credit of 20% of their R&D expenditure. All credits are taxable.

Businesses with no taxable income can get the credit as a payment. The rate of refundability depends on the tax situation of the company. Small businesses (defined as those with a taxable income below 300 000 CAD) are entitled to have the share of the credit that corresponds to current expenditure fully refunded while capital expenditure is partially refunded. R&D costs over 2 M CAD are refunded at a lower rate.

Canada also allows rapid write-off on capital investments related to R&D. Investments in machines and equipment required to conduct the R&D can be written off immediately.

Support targets

The SR&ED program has a broad focus with a clear bent towards SMEs and innovative businesses through the cash refund option. Refundable claims are prioritised and they should be processed within 120 days, while other claims can take up to a year. Overall, Canada's tax policy favours small companies with a corporate income tax rate of 18.3% for SMEs and a rate of 31.9% for other companies (OECD, 2001).

Administration and claim procedure

The SR&ED program is administered by the Canadian Revenue Agency (CRA). Companies claim support by sending in a form reporting actual R&D costs. The form should be submitted together with the tax return, and within six months of the end of the fiscal year.

Claims are reviewed by the CRA. SMEs are prioritised in this process, which can take quite some time (up to a year). Officers from the CRA may visit the company to investigate eligible expenditure and to examine the costs claimed.

A number of services are available to assist companies in making a claim. This includes a First-Time Claimant Service to assist small companies that are inexperienced in the claim process.

Eligible R&D expenditure

The following types of expenditure qualify according to the SR&ED incentive program:

- Wages for staff involved in R&D
- Costs of materials used in performing the R&D
- Costs of new machinery and equipment purchased for R&D
- Costs of R&D contracted out
- Third-party payments to organizations such as universities and colleges
- Certain overhead costs related to the R&D

Results

Each year, more than 11,000 companies claim support through the SR&ED program. According to the Canadian Revenue Agency, about 75% of those are small business with claims ranging from 20,000 CAD and 2,000,000 CAD. All in all, support worth 1,800 M CAD is paid annually, making it a very important contributor to R&D spending in Canada.

As already noted, Canada is one of the pioneers in using fiscal incentives to spur business innovation. Today, the Canadian economy is “one of the most buoyant in the G7 industrialised nations and the policy environment rivals the best in the OECD” (Economist.com, Country Briefings, Canada, Feb 23 2006). Although this is not only thanks to the SR&ED, it indicates that the fiscal incentives have been successful.

In 2002, the Canadian Revenue Agency conducted a survey of a large number of businesses in order to identify strengths and weaknesses of the SR&ED program. Three out of four respondents said that SR&ED is effective in encouraging R&D in Canada. More than 50% of the companies indicated that their profitability had been increased by the program and 50% said that SR&ED had helped with cash flow.

Future directions

The SR&ED program is continuously being improved by collaboration between the CRA and industry. A strategy plan has been developed and future improvements will be focused on three objectives:

- Improve the delivery of the SR&ED program to companies
- Increase awareness of the SR&ED program through communication initiatives
- Increase the accessibility of small businesses to the SR&ED program

Work in these directions will contribute to improving the timeliness of the SR&ED services. Predictability and consistency of the program will be strengthened, as this has been identified as a key issue among applicants. New initiatives are being taken to make companies (primarily SMEs) aware of the system and to facilitate their access. Documents and forms are being simplified to reduce the administrative burden of claiming support.

France

Background

Like Canada, France is a forerunner when it comes to stimulating business R&D through tax incentives. The main program, “Crédit d’impôt recherche” (Research tax credit - CIR) was launched in the 1980s and focuses on companies of any size and in any industry. “Jeune Entreprises Innovantes” (Young Innovative Companies - YIC) is a supplementary program that was introduced in 2004. YIC embodies a range of measures targeting the creation and growth of young research intensive companies in France.

Design of the tax incentive program

CIR is a tax credit program with a broad focus. Any company that is conducting R&D can get support from the CIR system. The basis for calculating the credit is both the volume of R&D conducted by the company and the incremental change in this volume over time. After recent modifications to the system, the credit will (from 2006) be equal to 10% of the R&D outlay and 40% of the increase compared to the average R&D outlay over the previous two years. The trend is to increase the volume-based part of the support which means less volatility from year to year, while still offering a clear incentive to increase R&D spending. The maximum level of credit is 10 M EUR per year (from 2006 and onwards). This is a sizeable increase compared to the earlier maximum of 8 M EUR.

Unprofitable businesses can carry credit forward to reduce future corporate tax. Three years after the credits have incurred, any remaining unused credits are refunded to the company.

Newly created companies with no profit can obtain the refunded credit immediately instead of having to wait for three years. A company is defined as new in the first five annual tax declarations, provided the company is not the result of a merger, a spin-off or anything similar. This “fast-track” refund can have a very strong influence on young research companies.

The Young Innovative Company system is, as one might imagine, a measure to strengthen the growth of young innovative companies. To obtain YIC status, companies must be maximum 8 years old and must be investing at least 15% of their expenditure in R&D. Public companies (listed on a stock exchange) are excluded from support.

Businesses that qualify for YIC status profit from a battery of different support measures. They are exempt from social costs for all employees in R&D-related activities (approximately 25% of gross salary costs). The definition of R&D-related activity is liberal and researchers, technicians, patent attorneys, and people working with testing are all included, as well as managers (including the CEO).

YIC companies are also relieved from corporate income tax for the first three years and pay 50% of normal taxes for the following two years, up to a maximum of 100,000 EUR in support. They can also be relieved from local taxes related to the value of properties and buildings.

Support targets

YIC has an obvious focus on SMEs, and specifically on young, innovative companies. However, the vast majority of companies claiming CIR are also SMEs (54% of credits are paid to SMEs). CIR can be very important to young and innovative companies. The immediate refund, combined with the substantial influence that an incremental increase in

R&D spending has on the tax credit, means that the CIR can significantly improve the cash flow for young biotech companies with rapidly growing R&D expenditure.

Administration and claim procedure

To obtain the CIR, companies file a declaration of their qualifying R&D costs along with their declaration of income for the year. The credit reduces the final tax for that fiscal year.

Companies are obliged to allocate and keep track of costs so that it will be possible to verify that a tax credit claim is correct. The fiscal authorities audit the company at intervals to verify the costs. According to French companies, the additional administration required to obtain the CIR is relatively moderate given the size of the support. One company that we have been in contact with had been audited twice over six years, which is not excessive. Another one had never been audited.

For YIC, companies apply for the status in advance. Once they have been approved, their monthly payments of social costs are reduced for all qualifying employees. YIC therefore immediately improves the cash flow of the company by lowering costs for personnel.

Eligible R&D expenditure

The following types of expenditure can be included to calculate the credit according to the CIR program:

- Wages for employees involved in R&D (200% of salary costs for Ph.D.s)
- Costs of materials used in performing the R&D
- Costs of new machinery and equipment
- Costs of subcontracted R&D
- 200% of costs for financing R&D by academia or public research institutes

The YIC status applies to social costs for everyone working in R&D plus a number of other positions. In one French company with 42 employees, 39 of those qualified for relief from social costs, which indicates that the YIC definition of an R&D employee is generous (France Biotech, www.france-biotech.org).

Results

The CIR is viewed by French authorities as a key strategy to keep large companies based in France and to support the development of SMEs. The R&D expenditure among the companies claiming CIR has increased from 5,993 M EUR in 1987 to 11,335 M EUR in 2003 (the last year with confirmed data available), indicating a positive effect on business R&D in France.

Despite the increase in R&D outlay, however, the number of beneficiaries and the amount of tax credit paid to such companies had decreased over the 10-year prior to 2003. This was attributed to the design of the credit. Until 2004, the credit was only based on the volume increase in R&D outlay, and as companies grew bigger and their R&D expenditure levelled out, the credit decreased.

The changes towards an increasing volume component of the credit have been accompanied by a heavily increased budget. In 2005, the cost of CIR was about 730 M EUR, a considerable increase from 480 M EUR in 2004. Recent changes to an even larger volume component will

increase the cost by at least 100 M EUR per year, which means very strong support to French R&D companies².

In 2004, the first year that YIC status was available, 862 companies gained this status—which involved a total of 4,880 employees (Ministère délégué à la Recherche, 2005). Such companies are by definition research-intensive, and many are active in the life sciences. The total cost of the YIC program has been about 40 M EUR per year, but is expected to increase to 120 M EUR in 2006³.

France Biotech has reported the cost saving in one specific biotech company qualifying for the YIC status (www.france-biotech.org). Thanks to YIC, the company saved 17% of total labour costs in 2004, which implies a total saving of 350,000 Euro—equivalent to 8 full-time employees. During the year, the company decided to recruit 8 new employees.

Future directions

France has considerably strengthened the incentives for innovation over the last few years and there is no reason to believe that this trend will not continue. One issue is an extension of the YIC status to include also companies that have been through an Initial Public Offering (IPO) and are listed on a stock exchange. YIC status is currently only available to privately held companies, which is a disincentive to take high-tech companies to the stock market.

² Declaration by Ministry of Industry, Dec. 15 2005,
http://www.industrie.gouv.fr/portail/ministre/decl.php?decl_id=3426

³ Declaration by Ministry of Industry, Dec. 15 2005,
http://www.industrie.gouv.fr/portail/ministre/decl.php?decl_id=3426

BOX 1. Neuro3d

Neuro3d is a young French pharmaceutical company that develops innovative treatments for central nervous system disorders. The company has two candidate substances in phase II and phase I clinical trials, and other molecules are in pre-clinical development.

Neuro3d was established in late 2000, and has grown rapidly. Today, 35 people are directly employed full-time. A total of 55.3 M EUR has been raised in three rounds to finance the development, supplemented with a total of about 2.0 M EUR received in cash advances and grants from government-related organisations.

The French tax system has clearly supported Neuro3d. According to Mr Julien Coste, CFO, Neuro3d qualified for nearly 3.8 M EUR in tax credit during the first three years of activity. When the company closed the third round of financing in 2004, its cash position was not much higher than this. Without the capital injection from the tax credit, the situation would have been much more uncomfortable, says Mr Coste.

Neuro3d has benefited from the design of the French CIR system, which encourages increases in R&D spending. In 2001, 50% of the eligible R&D costs were returned as tax credit! Being a young company, Neuro3d has been able to claim the credits as a refund without having to wait for three years.

Neuro3d is also qualified for exemption of social charges from the YIC status. Mr Coste says that YIC is reducing gross salary costs by a bit more than 11,000 EUR per employee. The saving is immediately strengthening the cash flow.

According to Mr Coste, the CIR and the YIC system are both very favourable for growing biotech companies. The administrative effort needed is moderate and can also be handled by a small company. Even though these tailor-made tools could still be improved, they already provide a great amount of support to high-potential but fragile innovative companies.

Norway

Background

The Norwegian government has expressed its ambition to reach R&D investments of 3% of GDP in 2010, a considerable increase relative to the current level of 1.64% (Eurostat data, 2004). Industry should contribute two-thirds of the 3%, which means that business R&D in Norway must double from 0.9% of GDP in 2004 to 2% of GDP six years later! A key instrument in achieving this bold objective is the SkatteFUNN (Tax fund), a tax incentive program for business R&D.

The predecessor of SkatteFUNN (called FUNN) was introduced in 2001 and was a grant-based form of support with a limited budget of 200 M NOK. SkatteFUNN was launched in 2002 as a tax credit program for SMEs. One year later, the program was extended to include businesses of any size.

Design of tax incentive program

SkatteFUNN is a tax credit program through which companies can have up to 20% of their R&D expenditure financed. Support is given for a specified R&D project rather than for R&D costs in general. The total R&D budget for the project must be limited to 0.5 M EUR (4 M NOK), or, in cases where the project is a joint collaboration with an approved research institution, 1 M EUR.

An SME can have a maximum of 20% of the R&D costs in the project covered by the credit, while the level for large companies is 18%. This restricts the support to 0.1 M EUR (0.2 M EUR if there is collaboration) for SMEs and slightly less for large companies. It is possible for a company to claim support for several R&D projects simultaneously but the total support cannot surpass the maximum limits.

Support targets

Compared to other systems covered in this review, SkatteFUNN has a broad focus. Support is distributed to a very large number of companies in all sorts of industries, but the injection given to each one is moderate in size. For instance, in 2004 6,009 Norwegian companies were recipients of support while only 2,760 French companies received the CIR tax credit (in 2003). Yet the CIR budget is much larger, and has a maximum tax credit of 10 M EUR, considerably more than the maximum of 0.2 M EUR given by the SkatteFUNN.

The conclusion is therefore that Norwegian policymakers consider it more important to reach a wide range of businesses than to target high-tech companies with significant amounts of support. By restricting the overall support, SkatteFUNN has (by design) only a marginal effect on R&D-intensive companies that have passed the start-up phase and need large R&D investments. The system is therefore not particularly friendly to the biotechnology sector.

Administration and claim procedure

SkatteFUNN is administered by the Norwegian Research Council and Innovation Norway. Companies claim support by submitting a description of the project along with company details over a web-based system. All claims are reviewed and the official target is to give an answer within two to three weeks of the application date.

Companies can claim support from SkatteFUNN at any time of the year. R&D costs that are approved give a reduced tax bill for that year. If the final tax bill is negative, the company receives the support as a payment.

The companies must report final and audited project costs. Recent changes to the scheme require that the companies report the allocation of personnel to the project for each day. While this may be reasonable for traditional businesses conducting a small R&D project, it could cause frustration among biotech companies that do R&D and nothing else.

BOX 2. Clavis Pharma

Clavis Pharma is a Norwegian drug discovery business with headquarters in Oslo. The company develops drugs based on its proprietary Lipid Vector Technology. The primary strategic area is oncology and Clavis Pharma is currently conducting phase II clinical trials in the US and Europe with its lead drug candidate ELACYT, in patients with metastatic malignant melanoma. A range of other anti-cancer drug candidates are in the pipeline, many at the late pre-clinical stage. Clavis Pharma also has projects targeting viral and inflammatory diseases and one of these substances is in phase I trials.

12 people are currently employed full time by the company and more than 90 people are involved in subcontracting or advisory functions. The company focuses entirely on R&D, with total costs of 35 M NOK in 2005.

Clavis Pharma has so far raised \$19 M from the current owners. A main challenge for the company will be to attract additional resources to take the current portfolio through clinical trials and perhaps strike a deal with a large pharmaceutical company.

How is SkatteFUNN stimulating the growth of Clavis Pharma? The company is receiving maximum support (1.6 M NOK) for a project being carried out in collaboration with a research institute. Ole Henrik Eriksen, COO of Clavis Pharma, says that the support is equivalent to the cost of 1–2 employees, and allows the firm to do a bit more R&D.

However, SkatteFUNN is not having a significant effect on the company's possibility of attracting funding or significantly accelerating the development. The current support of 1.6 M NOK is marginal relative to the total costs of 35 M NOK.

Ole Henrik Eriksen believes SkatteFUNN should narrow its focus and direct more support to fewer companies. Biotech companies like Clavis Pharma are unprofitable high-risk ventures with huge potential. Yet, today such companies are no more stimulated by SkatteFUNN than a cash flow positive business in a traditional industry.

Eligible R&D expenditure

SkatteFUNN co-finances R&D projects that aim to create new knowledge or information that can lead to new products, services or production methods.

- Salaries for employees involved in the R&D and in administration directly related to the R&D
- Costs of materials used in performing the R&D
- Costs of new machinery and equipment
- Costs for consultation or other services related to the R&D

Results

SkatteFUNN is indeed a veritable effort to spur Norwegian business innovation. SkatteFUNN investments have grown rapidly: from 700 M NOK in 2002 to an estimated 1,600 M NOK in 2004 (another estimate is 1,800 M NOK) [NIFU STEP, 2005; SkatteFUNN presentation, 2005]. For 2005, the costs were expected to level out or at least increase more slowly. Sixty per cent of the claimants are companies with less than 10 employees, and these receive about 40% of the support, which highlights the spread of the total support over a large number of companies (NIFU STEP, 2005).

SkatteFUNN is being evaluated in a project that is currently still in progress, with the final report due in 2007. The evaluation will, for example, look at whether SkatteFUNN is actually giving rise to new R&D projects and define the return on the projects being financed.

Evaluation of SkatteFUNN to date has indicated a positive effect on R&D spending. In one survey, 80% of the respondents indicated that projects they had received support for would not otherwise have been carried out. Seventy-two per cent said that SkatteFUNN is central to the company's strategy for growth (SkatteFUNN presentation, 2005).

These numbers are impressive, and SkatteFUNN is an important contribution to business R&D expenditure in Norway. It will be interesting to see the final results of the evaluation due in 2007.

Future directions

SkatteFUNN is being evaluated and discussed among Norwegian policymakers. It seems to have gained strong support as a key instrument in Norway's effort to increase innovation. The most crucial question for the future is the trade-off between giving everyone a small share of support and increased concentration on high-growth companies with large R&D investments. However, large changes to the program are unlikely before the latest data become available in 2007.

UK

Background

Tax relief for R&D was introduced in the UK in 2000, to stimulate SMEs investing in R&D. In 2002, the scheme was enhanced to include large companies also. A special tax credit was also introduced to promote investment in R&D leading to vaccines for third-world diseases.

The tax incentive program is a key component in the UK government's ambition to raise R&D investments to 2.5% of GDP in 2014. This is an increase of more than 30% from current levels, and is to be achieved mainly through higher levels of business R&D investments.

Design of tax incentive program

The UK government and the responsible authorities have invested considerable time in designing the tax relief. The main ambition has been to create a system that is simple and market-based. It is repeatedly stated in policy documents that the government should avoid "picking winners" and leave it to the market to distribute the resources to those companies having the largest chance of becoming future winners.

The UK tax incentive program is based on tax allowances. SMEs can deduct 150% of eligible R&D costs and large companies are allowed to deduct 125%. The rules for deducting capital investments related to R&D are among the most generous in Europe, and permit immediate write-off of investments in buildings and equipment.

Unprofitable SMEs are offered their tax incentives as an immediate refund. This option is exercised by many research companies in need of improved cash flow. Instead of carrying 150% of the R&D costs forward to reduce future taxes, the SMEs can choose to have a credit worth 24% of the R&D expenditure as a cash injection.

What is the value of the 24% tax refund? SMEs are facing 19% tax on their corporate tax income. The potential value of the tax deduction is therefore close to 30% of the R&D costs (150% multiplied by 19% = 30%). Choosing the refund means that the SME is having £24 per £100 of R&D outlay today, rather than £30 some time in the future. Improving the immediate cash flow comes at the expense of a worse cash flow later on.

From the point of view of the UK taxpayer, the payable credit means an investment in future tax streams. For each £24 credit that the UK gives to stimulate business R&D, the country reduces potential future tax claims by £30. In addition, the refund stimulates the growth and success of SMEs.

Support targets

The UK tax incentive program for R&D is clearly more supportive to SMEs than it is to larger companies. SMEs are, however, the only favoured group as the UK authorities consider simplicity in program design to be very important.

Administration and claim procedure

British companies claim the tax relief as part of their tax declaration. The system relies on self-assessment of the tax relief that the company is entitled to get. A proportion of claims are subject to detailed checking, which can lead to money being demanded back where the self assessment was proven incorrect.

Eligible R&D expenditure

The following types of costs qualify for R&D relief according to the UK tax incentive program:

- Staffing costs for R&D employees
- Costs for materials, water, fuel and power for R&D
- Software used directly for the R&D
- Subcontracting of R&D activities

Capital expenditure cannot be included for R&D relief, but may qualify for a 100% R&D capital allowance.

Result

The UK introduced tax incentives for SMEs in 2000, and extended the scheme to large companies in 2002. In December 2005, 17,580 claims had been filed by SMEs (statistics, HM Revenue & Customs, 2006) and over 2,000 claims for the large company scheme. In total, SME claims were worth £903 M and large companies had claimed tax relief of over £530 M. Close to 90% of the support to SMEs came through the payable credit, which shows the importance of the refund.

The numbers illustrate that the tax relief is an important form of support to business R&D. With increasing awareness of the tax relief, the numbers have increased year-by-year.

Is the UK tax relief successful in boosting R&D levels? Published data have shown growth in R&D spending among companies performing R&D, and particularly strong growth in the critical segment of medium-sized companies. Thus, between 2001 and 2005, the R&D expenditures in UK companies with less than 1,000 employees was close to 60% (HM Treasury, HM Revenue & Customs, 2005). The data also highlight the emergence of the R&D-intensive firms in sectors that are not traditionally R&D-intensive.

In 2005, a survey was conducted among nearly 1,000 R&D companies (Clemens et al, 2005). According to the responses, the tax incentive has a true influence on business R&D decisions. The majority of respondents said the tax relief had affected their investment decisions and influenced the level of R&D carried out. The incentive has made it possible to conduct longer-term projects (according to a third of the answers) and riskier projects (a quarter of answers). It is also interesting to note that 16% of the respondents said the tax relief had made it possible to attract R&D projects from abroad, or to prevent the transfer of research to facilities to other countries.

Predictability is a strong point of the UK tax relief, according to the survey. Of the companies that had made a claim, almost 90% were successful. This encourages long-term planning based on the fiscal incentive.

Future directions

The survey mentioned above was part of a thorough review of the tax relief program in order to identify areas for improvement. Overall, the review showed strong support for the existing system and did not indicate that any major changes were needed:

“The simplicity of the UK’s R&D tax credit, its improving consistency in delivery, and the growing stability around it as companies become accustomed to the scheme, are major

strengths that will increasingly enable firms to build the value of the tax credit into their investment appraisal decisions. The Government will not at this time consider any changes to the SME scheme that might compromise these key strengths” (HM Treasury, HM Revenue & Customs, 2005)

Any future improvements will therefore be within the framework that already exists:

- To improve the SME tax credit without losing the simplicity of the system. A swifter delivery of the payable credit is one possible improvement, as recipients are often in immediate need of the cash-flow
- To consider broadening the group of companies that benefit from the enhanced relief and payable credit, in order to include also the important segment of medium-sized companies
- To monitor the effect the tax relief is having on the decision of firms to locate R&D in the UK. A sizeable proportion of respondents said the tax relief did influence such decisions, and if this picture holds true, one alternative might be enhanced tax relief for large companies.

Conclusion

Canada, France, Norway and the UK all have tax incentives for business R&D, each country with its own particular design. All four countries view their incentives as being a key component to ensure future innovation and growth, and with the passage of time, have made their systems even more generous.

It is not yet possible to fully judge the effect of the incentives in terms of growth and increased R&D investment. This is partly because the measures were implemented relatively recently (France, Norway and the UK) and partly because the incentives cannot easily be isolated from other effects. The overall picture is, however, that the programs have catalysed investments in R&D which support innovative companies and create new job opportunities. The fact that the four countries are continuously adjusting their systems to make them increasingly generous indicates a strong belief in their positive effects.

	Canada	France	Norway	UK
Generosity	High	Generous, in particular to young and fast growing R&D companies	Generous overall, but very low maximum support	Medium - future tax deductions surrendered for refund today
Predictability	High	High	High	High
Administrative burden	Moderate	Moderate	Minimal	Moderate
Simplicity	Thresholds complicate the system	Based on incremental level and many thresholds	Very simple	Simple
Targeting	SMEs	SMEs, research intensive companies	General Collaboration with research institutes	SMEs

Table 3. Summary of tax incentive programs with respect to five critical parameters

Table 3 summarises the comparison with respect to the five parameters identified earlier. Overall, Norway has the most generous program (per capita); however, money is spent on relatively many companies. In fact, among the countries, Norway offers by far the *least* favourable conditions to a biotechnology company spending 3 M EUR on R&D per year. Canada, France and the UK would all stimulate this company by effectively lowering R&D costs by approximately 15%, compared to 6% in Norway.

Predictability of support is critical for long-term planning. All four countries do well with respect to this parameter. The same is true of administrative burden, which seems reasonable in all countries given the size of the support.

Simplicity in program structure is critical, and particularly important to encourage small companies to apply for support. Simplicity is the operative word throughout the UK tax credit program, but Norway also has a system with minimal complexity. France and Canada have more complex programs with respect to how the level of support is calculated. While complexity may theoretically improve programs, it is our belief that simplicity is critical in

ensuring that many companies will benefit from the support. The Norwegian SkatteFUNN seems particularly simple, accessible and manageable for companies, which could explain the large number of companies that are benefiting from the Norwegian tax support.

All countries except Norway are explicitly targeting SMEs through their increased support. As SMEs are financially the most vulnerable and also offer the largest opportunities for future growth, it is reasonable to spend most of the resources on this category of companies. The French YIC system differentiates companies by age, as only companies younger than eight years qualify for support. It is difficult to see the logic in categorising by age. Why should a nine-year-old company be less entitled to support than an identical seven-year-old company?

Importantly, all four countries offer a payable credit as an option for companies in a negative tax position. The countries differ largely in the timing of the payment of this credit, which is an important consideration, as R&D companies need the cash flow rapidly. The French YIC system compensates companies every month by exemption from social costs for employees. Canada is the slowest in compensating for R&D outlay.

To conclude, all countries have their own system. The Canadian and French programs have evolved over a longer period of time, are generous, but suffer from an accumulated amount of complexity. The French YIC system, launched in 2004, could probably come to be adopted by many other countries. Although it is not a perfect system, its immediate effect on cash flow and focus on the most innovative companies makes it an attractive alternative.

Norway has perhaps the simplest program; however, the maximum support level is much too low to have a substantial effect on the biotechnology industry. Norwegian politicians may want to ignite innovative flames within existing profitable companies rather than create a strong industry within very R&D-intensive areas. SkatteFUNN might then be the right choice. However, within the current program, there is a risk that taxpayers' money is used for R&D that would have been carried out in any case, rather than being used to stimulate the most innovative and financially vulnerable firms. The evaluation that is due in 2007 will answer these questions.

The UK tax relief program is simple in design and based on self-assessment of R&D outlay coupled with regular inspections. Companies with no profits can receive a payable credit today against surrendering their right to future tax deductions, a solution that is reasonable for taxpayers as well as companies. The program is not the most generous; however, countries copying the UK system can adapt the program to suit their budget and level of ambition.

BOX 3. The short-term cost of supporting innovation

A Swedish drug discovery company, currently employing approximately 25 people, has key substances near phase 1 clinical trials. R&D costs are approximately 30 M SEK per year and the owners have so far invested approximately 200 M SEK in the company. Another 200 M SEK will probably be needed to reach sustainable growth.

If Sweden adopted the UK tax relief system, the R&D costs would entitle the company to a payable credit of about 7 M SEK, equivalent to annual salaries for 10 new employees. This would be very supportive to the growth of the company. What would be the actual costs for the Swedish government?

Figure 6 illustrates short-term costs and benefits to the Swedish government. 50% of the tax relief would be returned to the state as social costs and personal income tax for the new employees. On top of this, the state would benefit from lower costs for unemployment (current unemployment rates for Swedish biologists and chemists are above 10%, (SACO, 2006)). Assuming the tax relief would generate 5 entirely new jobs, costs for unemployment could be reduced by approximately 1 M SEK per year.

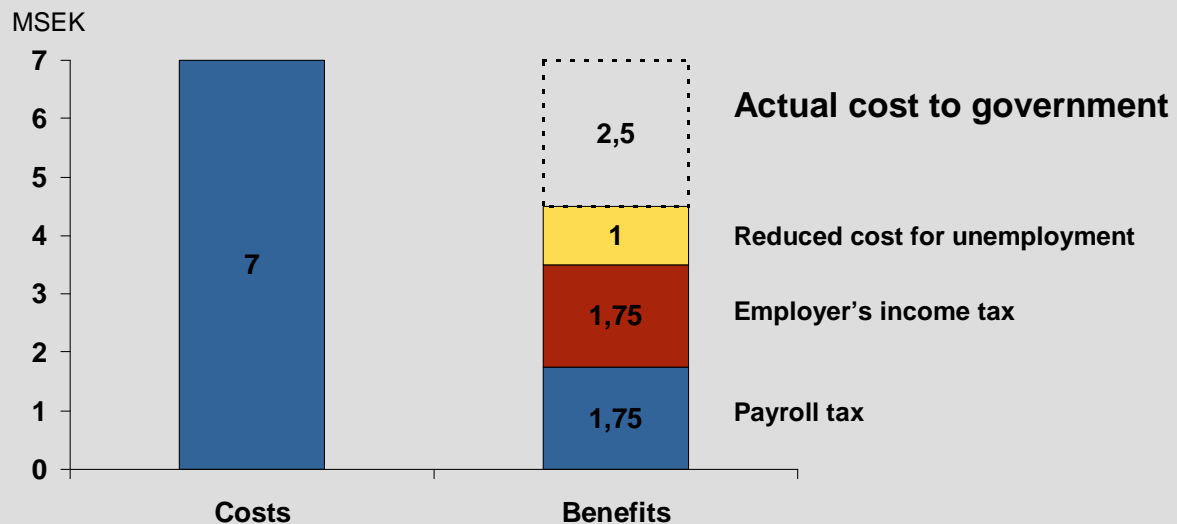


Figure 6. Direct benefits to the government would compensate for approximately 70% of the cost of a tax incentive program in Sweden.

A stimulation of innovation worth 7 M SEK would “cost” the government only 2.5 M SEK, i.e. 35% of the apparent cost. This 35% is an investment in future growth and job opportunities that would generate far-reaching dynamic effects far beyond the short-term costs.

* This example is general although modelled with one particular company in mind.

Recommendations

Tax incentives to R&D definitely stimulate biotechnology companies as well as other innovative companies. Any government seriously subscribing to the declarations of the Lisbon process should consider tax incentives for R&D. It is a market-friendly strategy that supports business innovation at the price of a minimum of overhead costs in terms of bureaucracy.

Three parameters are most important in designing tax incentive programs: generosity, simplicity and refundability; generosity because underfinanced programs are unlikely to have a real effect on business decisions regarding R&D investments; simplicity because only benefits that are simple, easy to understand and to claim will reach the vast majority of R&D companies; refundability (offering the incentive as a payable credit) because companies that have not yet reached profitability are those in most need of support.

We recommend any government considering tax incentives for R&D to consider the following general advice:

- Define the goal and level of ambition. If the budget is limited, a targeted grant to one or several strategically important areas might be preferable
- Include a payable credit option for unprofitable companies, and let the money reach the company as soon after the R&D outlays have occurred as is practically possible
- Avoid bureaucracy — the British system of self-assessment of R&D outlays is one attractive alternative
- Use a straightforward definition of eligible R&D costs
- Avoid categorising companies with respect to age and ownership (private and public companies)
- Avoid thresholds as far as possible — simplicity is preferable
- Outline the tax relief in close collaboration with industry
- Even before launching the tax incentive program, plan for continuous evaluation together with industry
- Avoid major changes to existing programs; predictability is a virtue

Box 4 outlines a program that would stimulate innovation, create highly qualified jobs and still constitute a modest investment, as it is targeted only to the most innovative companies. This recommended program is similar to the French YIC system; however, it is simpler in design. It targets only the most innovative of SMEs and stimulates them through exemption from social costs for all employees, which has an immediate effect on cash flow. Unlike the French YIC system, it does not involve lower income taxes and it does not categorise companies by age and ownership.

BOX 4. Recommended incentive design

Stimulation:

- Exemption from social costs for all employees carrying out R&D related work

Eligible companies:

- Innovative SMEs that spend at least 15% of their total outlay on R&D

Administration:

- Companies apply to be granted the status. The tax authority would be most appropriate to assess applications. If needed, the status of companies could be reassessed annually.

We recommend that governments caring about innovation should adopt the proposed program. Following the recommendation should allow a swift implementation process with good results.

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