PRB 03-46E

Library of Parliament Bibliothèque du Parlement

GOVERNMENT BUSINESS SUBSIDIES

Philippe Le Goff
Economics Division

22 January 2004

PARLIAMENTARY RESEARCH BRANCH
DIRECTION DE LA RECHERCHE PARLEMENTAIRE

The Parliamentary Research Branch of the Library of Parliament works exclusively for Parliament, conducting research and providing information for Committees and Members of the Senate and the House of Commons. This service is extended without partisan bias in such forms as Reports, Background Papers and Issue Reviews. Analysts in the Branch are also available for personal consultation in their respective fields of expertise.

CE DOCUMENT EST AUSSI PUBLIÉ EN FRANÇAIS

TABLE OF CONTENTS

CANADA
LIBRARY OF PARLIAMENT
BIBLIOTHÈQUE DU PARLEMENT

THE CONCEPT OF GOVERNMENT BUSINESS SUBSIDIES

INTRODUCTION

Government intervention in the economy is one of the major areas of disagreement between the Left and the Right on today's political spectrum. Traditionally, the Left is in favour of it, while the Right tends to be against it. This ideological opposition becomes less clear, however, on the subject of government business subsidies.

Left-leaning critics generally deplore the use of public funds for the benefit of businesses and to the detriment of funding for public services. Politicians and voters of a less interventionist persuasion criticize, among other things, the proliferation of business assistance programs and the inappropriate use of public funds, which contributes to increasing the tax burden on individuals. They maintain that business subsidies promote waste, economic distortion, political client–provider relationships and the corruption of elected politicians. In fact, there would seem at this point to be a consensus on both sides of the political spectrum against government business subsidies. The difference lies merely in the reasons behind this opposition. It is, moreover, by no means rare to find "Rightist" arguments used by the "Leftist" parties and vice versa.

At a time when many western governments are being obliged to respond to a serious deterioration in government finances and to the impact of weak global economic growth, there is strong pressure for them to refocus on their fundamental mandates (health, education, etc.), specifically by reducing government subsidies to business.(1) In Canada, this political platform was used by the Liberal Party of Quebec (in April 2003) and later by the Liberal Party of Ontario (October 2003) in the most recent provincial elections. This new "reformist" trend does not, a priori, aim to proscribe government business subsidies, but rather to codify their use

(1) The Americans use the term "corporate welfare."

in the context of the sound management of government finances, emphasizing the criteria of effectiveness, accountability and transparency.

The primary aim of this paper is to clarify the concept of government business subsidies and the logic that underlies its implementation. The second part analyzes this logic in light of the main conclusions presented in the economic literature, and outlines the elements of a more rigorous approach to managing programs of government business subsidies. In conclusion, the paper focuses on the appropriateness of submitting these programs to parliamentary review.

THE CONCEPT OF GOVERNMENT BUSINESS SUBSIDIES

A. Definition

At the outset, it will be helpful to clarify the meaning of "government business subsidies." The following definition appears in recent economic literature:

> Any government spending program that provides payments or unique benefits and advantages for specific companies or industries. This includes direct subsidies (to prop up commodity prices or provide cut-rate insurance and loans, for instance), grants, funding for specific applied research … and other special privileges.(2)

A basic definition on this scale does not normally give rise to major objections. Some analysts add tax deductions and tax credits granted to businesses to this list of types of subsidy, but opinion is divided on this point.(3)

The World Trade Organization (WTO), the Organisation for Economic Co-operation and Development (OECD) and the Commission of the European Communities have also formulated their own definitions, although these are generally less precise than those

---

(2) Stephen Slivinski, "The Corporate Welfare Budget Bigger than Ever," Policy Analysis No. 415, Cato Institute, Washington, D.C., 10 October 2001, p. 6.

(3) Those who are opposed to this addition generally argue as follows. Strictly speaking, the benefits granted under the heading of *government* assistance are derived from *assets that already belong to the government.* Tax deductions and tax credits, by contrast, do not yet belong to the government; they are amounts that are *still part of the wealth and income of businesses* and that the government has no intention of appropriating. Thus, speaking of government *assistance* in the sense of money granted by the government out of its own assets in the case of tax deductions and credits would be equivalent to saying that the assets of businesses ultimately belong to the government.

published in the economic literature. As far as the WTO is concerned, a subsidy is a financial contribution provided by the government or by any government agency within the territory of a member state and which confers a benefit on its recipient.(4) For the OECD, government business subsidies consist of "specific measures of direct or indirect financial support applied by a central or sub-national government in favour of a manufacturing industry that results in a net cost to the government." Lastly, the Commission of the European Communities defines government assistance as "a form of state intervention used to promote a specific economic activity."

B. Logic

Regardless of the subtleties of the definition agreed upon, the advocates of government business subsidies advance three traditional arguments in support of their position: reduction in operating costs; the creation of a pro-business climate; and competition from other governments that offer this type of assistance in order to attract investment.

---

(4) This definition corresponds to that given in the accords signed at Marrakesh in 1994 under the GATT (General Agreement on Tariffs and Trade), which include the Agreement Establishing the WTO (http://www.wto.org/english/docs_e/legal_e/04-wto.pdf). The GATT, which was signed in 1947, is to some extent the ancestor of the WTO.

In terms of international trade, article XI of the GATT recognizes the justification for certain forms of subsidy or business subsidies. In the Agreement on Subsidies and Countervailing Measures (http://www.wto.org/english/docs_e/legal_e/24-scm.pdf), the WTO distinguishes among three types of subsidy (see also the overview produced by the Paris Chamber of Commerce and Industry, on which this paper has drawn, at http://www3.ccip.fr/etudes/omc/accords/subvention.htm):

- *Prohibited subsidies* are those granted for the export and use of domestic products in preference to imported ones.
- *Actionable subsidies* exert a negative impact on another member state, i.e., they cause injury to the domestic industry of another signatory, nullification or impairment of benefits accruing directly or indirectly to other signatories under the 1994 General Agreement, or serious prejudice to the interests of another member.
- *Non-actionable subsidies* include assistance to research, assistance to disadvantaged regions and certain types of assistance for adapting existing facilities to new environmental requirements. Every state is required to give notice of this type of subsidy prior to implementing it, failing which it risks being ruled ineligible to benefit from this regime.

1. Reduced Operating Costs

Since taxes and levies are tantamount to costs, government assistance may contribute to reducing them and thus improving businesses' competitive position and profitability. Improved profitability should ultimately lead to greater investment and stronger job creation. According to this logic, governments benefit from assisting businesses financially.

The detractors of government business subsidies claim that this argument does not hold water, since the taxes and levies paid by businesses constitute only a small proportion of their operating costs (in comparison with salaries, equipment and raw materials), and this proportion becomes even smaller when differences in taxation from one state to another are considered. As a result, government subsidies must be massive in order to be significant in relation to the total costs borne by the businesses – and if this is not the case, the benefits to the businesses will be less than the cost to society of the drop in government receipts.

2. The Creation of a Pro-business Climate

There is a general belief that a *pro-business climate* is a bellwether of prosperity for a region or a country, which is then more likely to attract new investment, encourage the expansion of established businesses and stimulate the creation of new ones. Generally speaking, the business climate is defined as a government's or a jurisdiction's reputation for sensitivity to the needs of businesses. A reduction in business regulation and taxation is a way of improving the business climate, according to advocates of such reductions.

It is true that tax benefits and subsidies for businesses enhance the image and reputation of a country or a jurisdiction in terms of its relations with the business community and individual companies. It is also true, however, that they can lead directly to the under-funding of certain public services that are essential to business success. For example, businesses must be able to rely on high-quality infrastructure, a skilled labour force and a solid legal and security framework. This is a primary counter-argument used by the Left on the political spectrum; and, paradoxically, it coincides with the opinion expressed by a majority of business leaders when questioned about the factors that are most important to their organization's success.

3. Competition From Other Governments

According to the classic argument over global competitiveness and mobility, governments have no choice but to do as others do and grant business subsidies; otherwise, they will lose businesses and their benefits to neighbouring jurisdictions. This argument is particularly convincing when two neighbouring jurisdictions that offer similar comparative advantages in terms of market access, infrastructure or the labour force, attempt to attract a new business or investment. In such cases, government assistance may make the difference in terms of economic benefits, as is the case with many industrialized countries. This argument, based on inter-regional or international competitiveness, has undoubtedly contributed most to the creation and preservation of numerous business subsidy programs, specifically in the area of research and development,(5) despite what economic theory has to say on the subject.

In this context, the difficulty stems from the need to evaluate the cost-benefit ratio correctly. History has repeatedly shown that, in order to benefit from governments' generosity, businesses regularly tend to exaggerate the benefits that their presence, their establishment or their activity can bring to a region. Job creation and investment have often turned out to be less than promised, or have simply evaporated once the business has been established or the subsidy has been spent. This outcome has frequently contributed to discrediting business subsidies as an effective tool in economic development.

THE VERDICT OF RESEARCHERS

A. Questionable Effectiveness

For decades now, all governments have been formulating economic development policies with a view to job creation. In western countries, tens or even hundreds of billions of dollars flow out of government coffers every year to support businesses in the name of economic development.(6) How effective are these policies, which focus on grants, loans, tax credits and deductions? In short, what do taxpayers get for their money?

---

(5) See the appendix to this document.

(6) According to the Cato Institute, a private American research institute that examines public policy, the U.S. federal government spends approximately US$87 billion annually on business subsidies. Obviously, this figure does not include money spent by state and local governments (http://www.cato.org).

According to some experts, the question is not really whether economic development policies can be effective. Many studies show clearly that they can be and that they can create lasting, high-quality jobs. The real question is whether the benefits exceed the costs.

In an exhaustive review of the economic literature on the topic, Robert G. Lynch states that the answer to this question is no.(7) Virtually all the surveys of corporate managers and the statistical and econometric studies analyzed by Lynch show that government business subsidies in the form of tax benefits or other kinds of subsidies are largely cost-ineffective with regard to attracting new businesses and creating jobs.

Almost all of the hundreds of studies on this subject carried out around the world over more than 40 years reach the same conclusions, regardless of the methodology used, or the country or the period studied:

1. There is no clear evidence that government business subsidies, financed by a reduction in public services, significantly stimulate economic activity and create jobs. At best, the net impact is modest when tax breaks are granted over the long term.

2. It is not clear that the level of taxation imposed by a government on business is a primary factor in selecting where to establish and expand businesses.

3. According to surveys of business leaders, factors such as the cost and quality of the labour force, the quality of public services, proximity to markets, and access to raw materials or to a good network of suppliers are more decisive factors than tax incentives or grants when companies choose a location.

4. The literature provides only a few examples of a government winning jobs over another jurisdiction because of tax incentives or subsidies.

5. The subsidies granted to some businesses may prove to be discriminatory with regard to their competitors.

Such conclusions call to mind a number of Canadian industrial projects that have proved to be financial black holes for the government. One example is the Papiers Gaspésia plant at Chandler, Quebec, where the money invested by the government in restarting the plant, before the project was abandoned, reached $172 million (in subsidies, loans and loan guarantees) or almost $750,000 for each of the 230 jobs that the plant was supposed to provide.(8) Similarly,

(7) Robert G. Lynch, “Do state and local tax incentives work?” Economic Policy Institute, Washington, D.C., 1996.

(8) *Les Affaires* [Montréal], 4 March 2004.

the Cape Breton Development Corporation (Devco), wholly owned by the Government of Canada since 1967, closed its sole remaining coal mine in the fall of 2001 after swallowing billions of dollars. In constant dollars, over $3.5 billion was injected in the form of a variety of subsidies. During the 1990s alone, Devco lost about $1 billion in federal funds, or some $55,000 per employee per year.(9) Similar examples abound in many industries, from fishing through the auto industry to agrifood.

This dubious effectiveness of business subsidies was, moreover, acknowledged by the federal government in the 1995 Budget:

> Business subsidies frequently fail to achieve their desired purpose ... They tend to slow rather than stimulate adjustment; they discourage rather than encourage innovation, and they tend to become permanent.(10)

In the same context, the government announced that federal business subsidies would henceforth focus on expanding trade (exports), science and technology, and small and medium-sized enterprises (SMEs). The government stated at that time that Canada would not achieve its growth and economic development goals through largesse to businesses. Following this logic, it announced that business subsidies would henceforth mainly take the form of repayable loans, made available on conditions tailored to the promotion of genuine opportunities for expansion.

B. The Need for a More Rigorous Approach

This turnaround in terms of economic development policy, although partially justified by the budget constraints of the time,(11) is now consistent with the positions defended by numerous experts in the field of economic development. The formula for government business subsidies adopted almost 10 years ago by the federal government is described today by

---

(9) Fred McMahon, “Time to close Devco,” *National Post*, 11 November 1998.

(10) Department of Finance, “Reducing Business Subsidies,” *Budget 1995 – Fact Sheet*, February 1995, p. 20 (http://www.fin.gc.ca/budget95/fact/FACT_8e.html).

(11) In the context of the program review announced in the 1995 budget, according to which the federal government was to play a new role in the economy, departmental business subsidies were reduced significantly. At the time, the Department of Finance announced that it intended to move from subsidies totalling $3.8 billion in 1994-1995 to $1.5 billion in 1997-1998 (a drop of 60%).

economists in the field of economic development policy as *new generation*,[12] because it targets not only financing, but also services for SMEs, along with support for innovation and exports.

Although the issue of government business subsidies remains controversial and is likely to do so for a long time yet, specifically because of its political dimension, the experience of recent years has enabled economists and experts in the field to compile a list of principles that should guide government efforts to achieve more effective management of business subsidies.

1. Evaluate Benefits and Costs

As one researcher[13] points out, traditional economic development programs, which buy growth through subsidies and the expenditure of tax money, have proven to be relatively expensive for each job created, from the standpoint of the profile of the business receiving the subsidy, local economic conditions and the subsidy formula used. Generally speaking, empirical research has shown that business subsidies in regions where economic growth is strong have little relevance, since unemployed workers can find jobs easily, without the need for the government to increase taxes or reduce services to finance the assistance offered. It is regions suffering from a high level of unemployment and depressed economic activity that should be targeted.

In short, it is important that any grant be supported by prior analysis of the concrete benefits it is liable to generate, taking into account the amount of public funds being invested.

2. Concentrate on Businesses that Offer a High Return

A well-thought-out policy on business subsidies should focus on those businesses that are likely to generate the greatest socio-economic impacts for an area or region. This approach contrasts with numerous examples in the past where subsidies have been granted to attract media attention or in response to political pressures. The creation of high-wage jobs, the

---

(12) The Business Development Bank of Canada (http://www.bdc.ca) and Export Development Canada (http://www.edc.ca/index_e.htm) play a central role in the new generation Canadian strategy of support for business.

(13) Timothy J. Bartik, "Jobs, Productivity and Local Economic Development: What Implications Does Economic Research Have for the Role of Government?" in *Tax Policy in the Real World*, ed. Joel Slemrod, Cambridge University Press, New York, 1999, posted on the World Bank's Web site (http://www1.worldbank.org/wbiep/decentralization/Courses/Atlanta%207.23.01/bartik1999.pdf).

employment of local labour, opportunities for technology transfer or the consolidation of an industrial sector are relevant, positive criteria that should alone guide the allocation of government business subsidies.

3. Establish Guidelines

For reasons of equity and effectiveness, government business subsidies should be allocated in accordance with specific guidelines in order to limit political interference and to create a rational, transparent framework for assessing risks, benefits and costs.

Some authors go so far as to state that government business subsidies should also be governed by rules that are enshrined in legislation.(14) This formula would permit sanctions and consequently limitations on the misuse of public funds. It would also, however, make the process excessively rigid, and hence ineffective. Business needs flexible solutions and made-to-measure services in terms of financing, consulting and training.

4. Compensate for Market Deficits

Traditional economic theory states that governments must not intervene to support local economic growth through direct business subsidies, except when the markets are not operating efficiently or when there are deficits.

Among the main market deficits that hamper the development and growth of business productivity are those that have to do with access to information, employee training and access to financing.

Access to quality information, in the broad sense of the term, is a primary factor for any business that is seeking to improve its productivity and sustain its growth. It is axiomatic that the value of information cannot be correctly assessed until after it has been consumed. Uncertainty surrounding the value or the quality of information could reduce businesses' demand for information. SMEs, which are more vulnerable, are at a particular disadvantage in such a situation. For example, they may suffer from deficits in terms of their knowledge of business management, their use of new technologies and their access to foreign markets. The acquisition

(14) Timothy J. Bartik, *Who Benefits from State and Local Economic Development Policies?* W. E. Upjohn Institute for Employment Research, Kalamazoo, Michigan, 1991.

of useful knowledge in these areas may be relatively expensive and difficult for a young company to finance.

With regard to training, SMEs may be reluctant to invest in training their workforce, in view of the costs involved and the turnover of personnel due to competition among companies in the same industry to obtain the services of qualified employees.

Lastly, private financial institutions are more reluctant to lend to SMEs and to start-up companies because of the risks involved. Access to capital is therefore an issue of prime importance for businesses – particularly SMEs – when starting up or targeting cutting-edge technology market niches, where there is great uncertainty over the demand for products and the development costs.

Here again, many government economic development programs attempt to compensate for these deficits, either directly or through intervention by quasi-public or private agencies. Comparative studies involving many SMEs have shown that such programs can be effective, whether or not a business is receiving a subsidy. A distinction must, however, be drawn between programs of business subsidies aimed at generating new investment or creating new jobs on the one hand, and on the other, assistance programs that offer consulting services or funding to enhance business productivity. It is legitimate to regard a program in the latter category as effective if it enables businesses to enhance their productivity, even if the record in terms of job creation is more dubious.

5. Account for the Use of Public Funds

The most interesting idea, and the one that probably enjoys the broadest consensus among experts in the field, is the need to improve accountability with regard to government business subsidies. Many experts believe that an accounting process based on transparency, disclosure of the real costs of business subsidies, and mechanisms to follow up on the performance of investments over time could lead to greater effectiveness.

Furthermore, any government subsidies to a business should be granted on condition that certain objectives are achieved (level of investment, job creation, etc.). Thus, the government should be able to recoup its investment if a company does not meet its obligations under a contractual agreement.

Lastly, according to the principles of good governance and economic efficiency, government business subsidies should not be spread over a lengthy period. The granting of long-

term tax benefits (e.g., tax credits over 10 years) may undermine responsible policy with regard to government finances and future generations. Furthermore, empirical studies have shown that grants over a period of more than 10 years have little impact on business investment decisions.

Almost everyone will agree that it would be politically and economically damaging for Canada to renounce business subsidies at a time of intense international competition. Nonetheless, a periodic, in-depth review of business subsidies would probably contribute to making them more effective. In this regard, the Corporation for Enterprise Development[15] proposes a series of recommendations to strengthen the accountability and transparency of government business subsidies:

1. publish data on the cost of government business subsidies;
2. estimate the cost associated with each job created or preserved, using a rigorous, uniform method of calculation;
3. evaluate the performance of each business subsidy initiative, whether budgetary or fiscal, at the end of a specified period;
4. measure the performance of each business subsidy program using specific evaluation criteria and quantitative benchmarks that can indicate whether or not the program's objectives have been achieved.

CONCLUSION: REVIEWING GOVERNMENT BUSINESS SUBSIDIES

Proponents of government business subsidies often use arguments that are not corroborated by empirical research, although they seem convincing in light of the number of government programs and initiatives in this field. Notwithstanding this drawback and the range of ideological debate, there is consensus on a number of principles governing the granting of such subsidies.

First, every business subsidy must be subjected to proper, rigorous cost-benefit analysis. Then, regions suffering from high levels of unemployment or depressed economic activity must be given preference, and the subsidies must be made available on the basis of

(15) Brian Dabson, Carl Rist and William Schweke (Corporation for Enterprise Development), "Business climate and the role of development incentives," an article published by the Federal Reserve Bank of Minneapolis as part of the colloquium "The Economic War Among the States," Washington, D.C., June 1996 (http://woodrow.mpls.frb.fed.us/pubs/region/96-06/dabson.cfm).

clearly formulated guidelines in order to preclude political interference. Lastly, public funds must, as a priority, support local business initiatives, the development of SMEs and initiatives that contribute to labour force training, rather than targeting large multinationals.

Equally important is the need to improve accountability with regard to business subsidies, specifically through a focus on transparency, the disclosure of real costs, and a variety of mechanisms to monitor the performance of the investments over time, to achieve greater effectiveness. For example, it often happens that, once individual business subsidies have been put in place, often during economic downturns and with the best of intentions, they are forgotten for years and thus acquire a degree of longevity, at a time when the political or economic rationale for their existence has long faded.

It should be noted that parliamentarians can play a role in this regard. At present, a number of business subsidies (grants, tax credits and other expenditures of tax money, loans and loan guarantees) are not – because of a lack of access to relevant data, sufficient resources for analysis, or time – scrutinized by Canadian parliamentarians during their review of the Estimates. At a time when parliamentarians are proposing to devote more time and resources to reviewing the Estimates, they could ask for the tools and the resources they need to monitor the performance of government business subsidies a little more closely.

APPENDIX

R&D TAX SUPPORT IN THE G-7 COUNTRIES AND AUSTRALIA[1]

This annex summarizes key elements of the existing income tax systems for R&D in the G-7 countries and Australia. In particular, deductions for current and capital expenditures and any additional incentives (e.g., bonus deductions or investment tax credits) that are currently offered in these countries are described. Where applicable, special provisions relating, for example, to non-taxpaying companies, smaller firms or regional incentives are included.

Australia

The R&D tax concession in Australia is an income tax deduction equal to 125 per cent of eligible R&D expenditures. An eligible taxpayer must be a company incorporated in Australia, a public trading trust, or a partner in a partnership of eligible companies.

The definition of eligible R&D is based generally on the OECD definition of R&D. In order to be eligible, R&D requires either the presence of an appreciable element of novelty or the resolution of scientific or technical uncertainty through a program of systematic and investigative and experimental activities. In addition, the work must be based on principles of physical, biological, chemical, medical, engineering or computer sciences. Furthermore, the R&D must satisfy certain "Australian content" rules relating to key personnel and major items of plant and equipment, and the results of the R&D must be exploited on normal commercial terms and for the benefit of the Australian economy.

An annual minimum threshold of A$20,000 must generally be met for R&D spending to qualify for the tax concession. Eligible R&D expenditures include current costs and capital expenditures on plant and machinery and pilot plants that are used exclusively for R&D. R&D current expenditures are deductible at a rate of 125 per cent in the year incurred. R&D capital expenditures may be written off over three years on a straight-line basis. Expenditures for R&D carried on outside Australia are also eligible if the amount of such expenditures does not exceed 10 per cent of the eligible expenditures for the associated R&D project as a whole.

---

(1) This appendix is taken verbatim (except for footnotes and hyperlinks) from the Web site of the Department of Finance (http://www.fin.gc.ca/resdev/why3_e.html).

Canada

The federal income tax regime for R&D in Canada consists of income tax deductions and investment tax credits for eligible current and capital expenditures. An eligible taxpayer must be a business performing eligible R&D in Canada.

The definition of eligible R&D is consistent with the internationally accepted definition used by the OECD and includes basic research, applied research and experimental development. Certain support work is also eligible where such work is commensurate with the needs, and directly in support, of basic research, applied research or experimental development. There is also certain work that is excluded from the income tax definition of R&D -- generally because it is not considered to be R&D in accordance with the OECD definition.

Eligible current expenditures include: salaries or wages of employees directly engaged in R&D; the cost of materials consumed in R&D; lease costs relating to machinery and equipment used all or substantially all (90 per cent or more) for R&D; expenditures incurred under various types of contracts; and overhead and administrative costs. Eligible capital expenditures generally consist of expenditures for machinery and equipment that is all or substantially all used or consumed in the prosecution of R&D in Canada. However, not all current and capital expenditures are eligible expenditures. For example, capital expenditures for the acquisition of land or buildings (other than a highly specialized R&D building), and current expenditures for related rental or leasehold payments are not allowable R&D expenditures. Also excluded are expenditures made to acquire rights in, or arising out of, R&D.

Eligible current and capital expenditures are fully deductible; expenditures that are not deducted in a year can be carried forward indefinitely. There are two rates of investment tax credit for R&D: a general rate of 20 per cent and, for certain smaller businesses, an enhanced rate of 35 per cent on up to $2 million of eligible expenditures. Expenditures on new equipment used for both R&D and other purposes may also qualify for an investment tax credit equal to one-half of the normal credit.

Investment tax credits may be used to reduce federal income taxes otherwise payable. Tax credits which are not used in the year they are earned can be carried back three years or carried forward 10 years. In addition, smaller businesses eligible for the enhanced rate of tax credit and unincorporated businesses can obtain a refund of unused credits earned in a year. The general rate of refund is 40 per cent for tax credits earned on both current and capital expenditures. However, a 100 per cent refund is available for tax credits earned on current

expenditures at the enhanced rate. Corporations can also assign expected refunds of tax credits to lenders as security for bridge financing for their operations. Such assignments, however, are not binding on the Crown.

France

R&D current expenditures are fully deductible in France. Straight-line depreciation is the normal method of depreciation for capital assets and is prorated for the first taxation year. Rates of straight-line depreciation are not set out in tax legislation and vary by asset type and the normal useful life of the asset according to the usages of each industry, commerce or business. Straight-line rates for machinery generally range from 10 per cent to 20 per cent; and for plant, from 10 per cent to 15 per cent. The straight-line rate for patents, materials and computer software is 20 per cent. Declining-balance depreciation is an optional method for certain capital assets, including R&D machinery, material and equipment that have a useful life of at least three years. Rates of declining-balance depreciation equal: 1.5 times the straight-line rate for assets with a normal useful life of three to four years; 2 times the straight-line rate for assets with a normal useful life of five to six years; and 2.5 times the straight-line rate for assets with a normal useful life of over six years. Costs of industrial buildings are depreciable generally at a rate of 5 per cent on a straight-line basis.

France also provides an incremental tax credit for eligible R&D spending by corporations. The definition of eligible R&D is based largely on the OECD definition of R&D and includes basic research, applied research and experimental development. Eligible expenditures include salaries and benefits, operating costs, certain contract payments, patent costs and depreciation allowances in respect of capital property including buildings. The rate of incremental tax credit is 50 per cent. The credit base is the amount by which a corporation's eligible R&D spending in a year exceeds its average level of eligible R&D spending, adjusted for inflation, for the previous two years. The amount of incremental tax credit can be positive or negative. A positive credit can be used to reduce corporate profit and income tax otherwise payable in the year to a maximum of FF40 million and is not taxable. For new firms, unused credits are fully refundable. In all other cases, unused credits can be carried forward for up to three years at which time any remaining unused credits are fully refundable. A negative credit reduces positive tax credit amounts in subsequent years. However, the amount of negative credit

carried forward cannot be larger than the sum of positive tax credits that a firm has previously received.

Germany

In Germany, R&D current expenditures are fully deductible in calculating taxable income. R&D capital expenditures are subject to the same treatment as other depreciable assets. Rates of depreciation vary by asset category and capital assets can generally be depreciated using either the straight-line method or the declining-balance method. The statutory straight-line rate of depreciation for machinery is 10 per cent; for computers, 20 per cent; and for patents, ranges between 14 per cent and 20 per cent. The corresponding rates of declining-balance depreciation are up to three times the allowable straight-line rate to a maximum of 30 per cent per year. Costs of new buildings are depreciable only at a rate of 4 per cent on a straight-line basis.

There are no additional incentives available for firms performing R&D in Germany.

Italy

R&D current expenditures in Italy may be either fully deducted in the year incurred or amortized on a straight-line basis over a maximum of five years. Capital expenditures are generally depreciable on a straight-line basis, subject to a half-year rule, and rates of depreciation vary by asset category. Expenditures on machinery and equipment are generally depreciated over a period of 10 years; building costs, over 33 years. Companies may also claim accelerated depreciation in respect of R&D capital assets; specifically, these expenditures are depreciable at the statutory rate for the first taxation year and at a rate that is up to double the statutory rate for the second and third taxation years. The undepreciated capital base may then be written off on a straight-line basis over the remaining life of the asset.

Currently, there are no additional incentives available for firms performing R&D in Italy.

Japan

In Japan, R&D current expenditures are fully deductible in the year incurred or may be amortized over a period of not less than five years. R&D capital expenditures may be

subject to ordinary depreciation, increased initial depreciation or accelerated depreciation. Expensing is allowed for capital assets costing less than 200,000 yen.

Ordinary depreciation is available for all tangible assets, other than land, and certain intangible assets such as patents, copyrights and trademarks. It is based generally on the statutory useful life of an asset. Methods of calculating ordinary depreciation include the straight-line method, declining-balance method or any other approved method. The amount of the allowance is prorated in the year the expenditures are incurred.

Increased initial depreciation and accelerated depreciation are tax incentives available for certain types of machinery, plant, equipment and buildings. These special depreciation measures are intended to help achieve a variety of policy objectives including support for R&D undertaken in certain regions or by certain types of firms. Increased initial depreciation provides a rate of depreciation higher than the rate of ordinary depreciation otherwise available for the year in which the asset is first used. Accelerated depreciation provides a rate of depreciation in excess of the rate of ordinary depreciation otherwise available over a specified number of years.

Japan provides three different corporate tax credits for R&D: a general 20 per cent credit for incremental expenditures; a 7 per cent credit for basic technologies; and a 6 per cent credit for small and medium-sized businesses. None of the R&D tax credits are taxable.

To qualify for the 20 per cent incremental tax credit, the R&D must be undertaken in order to manufacture products or to improve, design or invent production techniques. Eligible expenditures consist of R&D current expenditures (that is, salaries and wages of employees engaged exclusively in R&D, cost of materials and related expenditures) and depreciation allowances for R&D machinery, and equipment and buildings. The credit base equals the amount by which R&D spending in a year exceeds the largest amount of R&D spending incurred by the company in any year since 1966. The credit may be used to reduce corporation tax otherwise payable to a maximum of 10 per cent of the company's annual tax liability. Unused incremental tax credits may not be carried over for use in other taxation years.

The 7 per cent basic technologies tax credit is additional to the 20 per cent incremental R&D tax credit, but the combined amount of the two credits cannot exceed 15 per cent of corporation tax otherwise payable. The credit applies to expenditures on depreciable capital assets used for R&D in respect of certain basic technologies. The latter are: advanced

robots and machinery; advanced processes; advanced artificial conditions; advanced electronics; biotechnology; and new material technology.

The 6 per cent R&D tax credit for small and medium-sized businesses may be used only in lieu of the 20 per cent incremental R&D tax credit but together with the 7 per cent basic technologies tax credit, to a maximum of 15 per cent of corporation tax otherwise payable. Eligible expenditures are the same as those for the 20 per cent incremental R&D tax credit. Small and medium-sized businesses are defined as those with capital of 100 million yen or less or less than 1,000 employees.

United Kingdom

The United Kingdom offers special tax incentives for scientific research. The definition of eligible R&D is based largely on the OECD definition of R&D. R&D current expenditures are fully deductible from taxable income in the year they are incurred. R&D capital expenditures are also fully deductible if the scientific research is related specifically to trade or the monies are paid to a scientific research association. R&D capital expenditures that are connected with trade, other than costs of acquiring land, may also be eligible for a 100 per cent deduction.

United States

Under federal law, certain current expenditures for R&D carried on by, or on behalf of, a taxpayer may be either fully deducted in the year incurred or amortized over a period of no less than 60 months beginning with the month in which the taxpayer first realizes benefits from the expenditures. To be eligible, the expenditures must be incurred in connection with a trade or business of the taxpayer and relate to R&D in the experimental or laboratory sense (that is, to activities intended to discover information that would eliminate uncertainty concerning the development or improvement of a product). Uncertainty exists if the information available to the taxpayer does not establish the capability or method for developing or improving the product or the appropriate design of the product. The term “product” includes any pilot model, process, formula, invention, technique, patent or similar property. Spending in respect of several types of R&D is not eligible – specifically, expenditures concerning: quality control testing; efficiency surveys; management studies; consumer surveys; advertising or promotions; historical or literary research; and the acquisition of another’s patent, model, production or process. Also ineligible

are expenditures for acquiring or improving land, oil or gas exploration, and depreciable or depletable property used in experimental work.

Tangible capital property is depreciated generally under the Modified Accelerated Cost Recovery System (MACRS). Under the general MACRS rules, depreciation methods are prescribed for each class of property and include the 200 per cent declining-balance method, the 150 per cent declining-balance method and the straight-line method. The number of years over which an asset can be depreciated is also prescribed for each property class. Averaging conventions (half-year, mid-quarter or mid-month, as applicable) are used to calculate the MACRS deductions for the tax year in which the property is placed in service and the tax year of disposition.

The federal government also provides a non-refundable 20 per cent income tax credit for certain incremental R&D expenditures incurred in an existing trade or business of the taxpayer. Eligible R&D is that eligible for the 100 per cent deduction, undertaken for the purpose of discovering information that is technological in nature and intended to be useful in the development of a new or improved business component of the taxpayer, and substantially all of the activities of which constitute elements of a process of experimentation to achieve a new or improved function, performance, reliability or quality. If the R&D relies fundamentally on principles of the physical or biological sciences, engineering or computer science, the new information is deemed to be technological in nature. The process of experimentation must involve evaluation of more than one alternative designed to achieve a result where the means of achieving that result is uncertain at the outset.

R&D and spending that are ineligible for the 100 per cent deduction are also ineligible for the incremental tax credit. In addition, R&D does not qualify for the incremental tax credit if it is: research performed outside the United States; research in the social sciences, arts or humanities; research funded by another person or government entity by means of a grant or contract; research conducted after commercial production; and research conducted for the adaptation or duplication of an existing business component.

Eligible expenditures consist of wages for employees involved in the research activity, costs of supplies used in research, payments to others for the use of computer time in qualified research, 65 per cent of the amount of contract payments for R&D performed on behalf of the taxpayer, and 75 per cent of amounts paid to a qualified research consortium for R&D performed on behalf of the taxpayer and one or more unrelated taxpayers. The credit also

applies to amounts paid or incurred by a corporation for basic research by colleges, universities and other qualified organizations, to the extent that those amounts exceed certain base period amounts.

The base for the incremental tax credit is the amount by which eligible R&D spending in a year exceeds a base amount. The base amount is the product of the ratio of eligible R&D spending to gross receipts for the period 1984 to 1988 (that is, the "fixed base percentage") and the average of the taxpayer's gross receipts for the four preceding years. However, the fixed base percentage cannot exceed 16 per cent. In addition, the base amount cannot be less than 50 per cent of the taxpayer's current year eligible R&D spending. The credit may be used to reduce corporate income taxes otherwise payable and unused credits may be carried back three years or carried forward 15 years. The deduction for eligible R&D current expenditures is reduced by the amount of incremental credit claimed in a year.