

Measuring the Compliance Cost of Tax Expenditures: The Case of Research and Development Incentives

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PRÉCIS

Cet article évalue quantitativement les coûts d'observation liés aux incitatifs fiscaux en faveur de la recherche scientifique et du développement expérimental (RS et DE); l'article est basé sur une enquête auprès de 51 compagnies ayant leur siège social en Ontario. Ces compagnies représentent environ 30% des montants réclamés pour RS et DE au Canada.

Le principal résultat de l'enquête est que, malgré la tâche connue pour être considérable de tenir les dossiers financiers et techniques nécessaires pour justifier les demandes de crédits pour RS et DE, les coûts d'observation liés à ces crédits sont dans l'ensemble peu élevés, n'atteignant que 0,7% des crédits réclamés. Le niveau de l'activité en R-D au Canada est considéré comme faible, mais en général il ne résulte pas des coûts d'observation liés au programme de RS et DE. Toutefois ces coûts peuvent avoir un certain effet de découragement sur les activités de R-D dans les entreprises qui présentent des demandes de crédit pour RS et DE peu élevées. Quoiqu'un moyenne le coût d'observation lié aux demandes pour RS et DE est inférieur à 1% des montants réclamés, il peut représenter plus de 15% pour les entreprises qui demandent moins de 200 000 \$.

Un total de 24% des dépenses fédérales en R-D est versé sous forme de crédits d'impôt, un autre 17% est versé sous forme de subventions. L'enquête a également examiné, quoique dans une mesure moindre, les coûts d'observation liés aux subventions. Ces coûts, comme ceux liés aux crédits pour RS et DE, sont faibles, ne s'élevant dans l'ensemble qu'à environ 2% du montant total des subventions. En fait, pour les entreprises qui obtiennent à la fois des subventions et des crédits pour RS et DE, le coût d'observation par dollar reçu est moins élevé dans le cas des

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subventions. Toutefois ce chiffre de 2% ne tient pas compte des coûts que doivent assumer ceux dont la demande est rejetée.

Étant donné que l'étude dont nous discutons ici semble être la première à avoir examiné les coûts d'observation liés à une dépense fiscale particulière, deux de ses conclusions peuvent présenter un intérêt plus large. Premièrement, si dans le passé d'autres études ont constaté que pour les petites entreprises les coûts d'observation sont relativement plus élevés, la présente étude suggère que dans le cas des dépenses fiscales, le montant réclamé peut être plus important que la taille de l'entreprise : les entreprises qui demandent des sommes peu élevées encourent des frais élevés, même si ces entreprises sont de taille importante. Deuxièmement, pour certaines dépenses fiscales, les coûts d'observation peuvent être imputés principalement au travail du personnel technique et scientifique et moins au travail du personnel de la comptabilité. L'étude a constaté qu'environ deux tiers des coûts d'observation liés au programme de crédits d'impôts pour RS et DE sont attribuables au travail du personnel technique et scientifique. Le programme peut donc susciter des difficultés pour les petites entreprises en obligeant leurs cadres à consacrer une partie de leur temps à l'observation fiscale, au détriment de leurs activités proprement dites pour la R-D.

ABSTRACT

This article quantifies the compliance costs associated with the tax incentives for scientific research and experimental development (SR & ED) on the basis of a survey of 51 companies with head offices in Ontario. These companies account for about 30 percent of all SR & ED claims in Canada.

The main finding of the article is that despite the reputedly extensive financial and technical record-keeping required to support an SR & ED claim the compliance costs associated with SR & ED credits are quite low in aggregate, amounting to just 0.7 percent of the credits claimed. Thus it appears that the perceived low level of R & D activity in Canada is not, in general, a result of the compliance costs associated with the SR & ED program. These costs may, however, have some discouraging effect on R & D activity by firms with relatively small SR & ED credit claims. Although on average the compliance cost associated with SR & ED claims is less than 1 percent of the amount claimed, for firms with claims of less than \$200,000 the figure can be 15 percent or more.

Fully 24 percent of federal R & D spending is delivered through tax credits; another 17 percent is delivered through grants. The survey also investigated, although to a more limited extent, the compliance costs associated with grants. These costs, like those associated with SR & ED credits, are low, amounting in aggregate to about 2 percent of the total value of the grants. In fact, for firms that receive both grants and SR & ED credits, the compliance cost per dollar received is lower for the grants. The figure of 2 percent does not, however, take into account the costs borne by unsuccessful applicants.

Since the study discussed here appears to be the first to examine the compliance costs associated with a particular tax expenditure, two of its findings may be of broader interest. First, whereas past studies have found that small firms incur disproportionately high compliance costs, the study suggests that in the case of tax expenditures the size of the claim may be more important than the size of the firm: firms with small claims incur high costs, even if the firms are large. Second, for some tax expenditures, compliance costs may result mainly from work by technical and scientific employees rather than accounting employees. The survey found that about two-thirds of the compliance costs associated with the SR & ED tax credit program arise from the work of technical and scientific employees. Thus the program may create difficulties for smaller firms by forcing the company principals to divert some of their time from the actual R & D work to tax compliance.

Tax laws should represent a compromise among several goals. One goal is simplicity, of which a key component is keeping to a minimum the “compliance costs” that taxpayers incur in assessing their tax liabilities.¹ As Adam Smith has said, “[e]very tax ought to be so contrived as both to take out and to keep out of the pockets of the people as little as possible over and above what it brings to the treasury of the state.”²

Tax simplification has seldom been an important objective of tax policy in Canada; the major exception is the exercise in small business tax simplification in the early 1980s that eliminated the cumulative deduction account. One possible reason for the lack of prominence of tax simplification in the tax policy process is the paucity of empirical evidence about the compliance costs of alternative tax policies.

The few reported studies of compliance costs have focused on estimating the total compliance costs of particular taxes and examining how these costs vary with the demographic characteristics of particular taxpayers. François Vaillancourt’s 1989 study of the Canadian personal income tax and payroll tax system estimated that total compliance costs were 6.9 percent of revenues collected, and that the main determinant of the costs to an individual was the complexity of the individual’s tax situation in terms of types of income, use of tax shelters, and so forth.³ Similarly, a

¹ Robert Couzin, “The Process of Simplification” (1984), vol. 32, no. 3 *Canadian Tax Journal* 487-500, at 489: “[A] tax measure may generally be said to enhance tax simplification if it facilitates compliance.” Simplification also includes keeping to a minimum the administrative costs of the government.

² Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, ed. by E. Cannan, vol. 2 (London: Methuen University Paperbacks, 1961), 351.

³ François Vaillancourt, *The Administrative and Compliance Costs of the Personal Income Tax and Payroll Tax System in Canada, 1986*, Canadian Tax Paper no. 86 (Toronto: Canadian Tax Foundation, 1989). See also François Vaillancourt, “The Compliance Costs (The footnote is continued on the next page.)

1993 study by Plamondon & Associates concluded that businesses in the sample with sales of under \$200,000 incurred about \$4 in costs for every \$1,000 of sales, whereas businesses with over \$1 million in sales incurred costs of only 60 cents per \$1,000 of sales.⁴

Studies of the total compliance costs of particular taxes provide a general sense of the magnitude of compliance costs and also offer useful generalizations about how these costs vary with the type of taxpayer. Often, however, they are more relevant to decisions about the introduction or abolition of entire taxes than they are to the piecemeal reform of particular tax provisions found in most annual budgets. The task of studies intended to support less comprehensive reforms is to identify any provisions of the tax law or its administration that create a disproportionate level of compliance costs and to define the appropriate remedial amendments. As Richard Bird has said, “[i]n taxation, it is usually the details that matter, and this dictum is also true with respect to cost studies.”⁵

There is reason to believe that tax expenditures involve significant compliance costs.⁶ With all public expenditures, there is a need for targeting: a government must ensure that the expenditure of public funds (or the forgoing of revenue) will encourage the activities that the government wishes to encourage. The targeting may be accomplished through increased auditing, a complex definition of qualifying activities or expenditures, or special rules designed to police the borderline.⁷ All of

³ Continued . . .

of Sales Taxes in Canada: Evidence from the Eighties, Prospects for the Nineties,” in *Symposium on the Simplification of the Federal/Provincial Sales Tax System* (Toronto: Canadian Tax Foundation, 1993), tab 6.

⁴ Plamondon & Associates Inc., *GST Compliance Costs for Small Business in Canada: A Study for the Department of Finance Tax Policy* (Ottawa: Plamondon & Associates, 1993). Recent compliance cost studies in other countries include Marsha Blumenthal and Joel Slemrod, “The Compliance Cost of Taxing Foreign-Source Income: Its Magnitude, Determinants, and Policy Implications,” draft paper presented at “National Tax Policy in an International Economy,” International Tax Policy Forum Conference, March 22, 1994; J. Pope, R. Fayle, and D.L. Chen, *The Compliance Costs of Public Companies’ Income Taxation in Australia, 1986/87* (Sydney: Australian Tax Research Foundation, 1991); Cedric Sandford, Michael Godwin, and Peter Hardwick, *Administrative and Compliance Costs of Taxation* (Bath, UK: Fiscal Publications, 1989); Joel Slemrod and Marsha Blumenthal, *The Income Tax Compliance Cost of Big Business* (Washington, DC: Tax Foundation, 1993); and Maarten Adriaan Allers, *Administrative and Compliance Costs of Taxation and Public Transfers in the Netherlands* (Groningen: Wolters-Noordhoff, 1994).

⁵ Richard M. Bird, “The Costs of Collecting Taxes: Preliminary Reflections on the Uses and Limits of Cost Studies” (1982), vol. 30, no. 6 *Canadian Tax Journal* 860-65, at 865.

⁶ Some limited empirical evidence of this assertion is available in connection with the compliance costs of zero-rating under value-added taxes. See Sijbren Cnossen, “Administrative and Compliance Costs of the VAT: A Review of the Evidence” (June 20, 1994), 8 *Tax Notes International* 1649-68.

⁷ For an example of the problems of policing the border, see the discussion of the taxation of transborder flights under the GST in Richard M. Bird, “The Cost and Complexity of Canada’s VAT: The GST in an International Perspective” (January 3, 1994), 8 *Tax Notes International* 37-47.

these measures inflate compliance costs and may even limit the ability of the tax expenditure to induce the desired behavioural change—taxpayers may conclude that the offered incentive is not worth the effort involved. Quantitative studies of compliance costs can assist governments in making the appropriate tradeoff between targeting and simplification.

Tax incentives for scientific research and experimental development (SR & ED) exhibit this tension between targeting and compliance costs.⁸ SR & ED tax incentives represent a major portion of federal government R & D spending. Because of the fiasco of the scientific research tax credit in the early 1980s, however, the targeting of SR & ED incentives has received a great deal of attention from Revenue Canada. The documentation required to support an SR & ED claim is extensive. First, there must be scientific documentation: the claimant must be able to prove to a Revenue Canada science adviser that the activities in question involve a degree of scientific or technological innovation sufficient to qualify them as SR & ED. Second, there must be financial records: the claimant must be able to satisfy a Revenue Canada auditor that the expenditures involved are directly attributable to the research and development project. Revenue Canada has been vigorous in auditing SR & ED claims; taxpayers who claim an investment tax credit refund are often audited before a refund cheque is issued. Taken together, these considerations suggest that the compliance costs associated with SR & ED incentives are potentially high and hence worthy of investigation.

There is another reason for investigating the compliance costs associated with SR & ED incentives. According to the Conference Board of Canada, Canada's system of tax incentives for R & D is the most generous in the industrialized world;⁹ nevertheless, there is dissatisfaction with the level of research and development spending of Canadian businesses. One possible reason why the level of R & D spending is less than satisfactory is that the compliance costs of the SR & ED incentives reduce the effectiveness of this important component of government R & D support.

This article uses the results of a survey of companies active in R & D to measure the compliance costs associated with the federal SR & ED incentives.¹⁰ Since a large portion of total federal R & D spending is delivered through grants,¹¹ the article also investigates the compliance costs associ-

⁸ For a detailed description of SR & ED incentives, see Kenneth J. Murray, *Strategies To Stretch Your R & D Dollar* (North York, Ont.: CCH Canadian, 1993).

⁹ Jacek Warda, *Canadian R & D Tax Treatment: An International Comparison*, Report no. 125-94 (Ottawa: Conference Board of Canada, 1994).

¹⁰ Provincial SR & ED incentives, such as the Ontario superallowance, are not included in this study.

¹¹ SR & ED tax incentives represent 24 percent of federal government R & D spending and grants approximately 17 percent. The remainder is divided between universities (21 percent) and government laboratories (38 percent). See Robert Hamilton, "Tax Incentives and Innovation: The Canadian Treatment of R & D" (1993), 19 *Canada-United States Law Journal* 233-57, at 240.

ated with these grants. Thus the article is, among other things, a contribution to the literature on the choice between grants and tax incentives for business.¹²

The value of our survey results is limited by certain methodological constraints that we shall explain in detail below. Although these constraints are common to many empirical studies of tax issues and will continue to exist as long as tax records remain confidential, they must be acknowledged from the outset. Their effect is such that one must be cautious in generalizing from the survey results to SR & ED claimants in general.

METHODOLOGY

This article is based on the results of a written survey conducted in the spring and summer of 1994. Because of the complexity of the information requested, we asked each respondent to attend one of four 90-minute orientation meetings we conducted at locations in Ontario. In the course of these meetings, the survey was given out and reviewed in detail, its objectives were discussed, and the respondents were given time in which to ask questions. For the most part, the survey questions were objective; consequently, there was little likelihood that our responses to the questions raised at the meetings would bias the respondent's answers to the survey questions. After attending a meeting, the respondent returned to his or her office, phoned a contact person for further clarification if necessary, gathered the required data, and mailed in the questionnaire. We dealt with respondents who were unable to attend an orientation meeting by means of conference calls that lasted about as long as the orientation meetings and covered the same ground. The disadvantage of our not meeting some respondents face-to-face was offset by the fact that the availability of this alternative made it easier to get potential respondents to agree to take part in the survey. About two-thirds of the respondents participated in the orientation meetings.

The survey faced a basic methodological problem common to much of the work in this field. Because of the Income Tax Act's privacy restrictions, no universal list of SR & ED claimants is publicly available. Only a tiny fraction of all corporations—much less than 1 percent—make an SR & ED claim each year.¹³ It was therefore impossible either to use random selection in choosing potential participants in the survey or to verify

¹² For a survey of the factors that affect this choice, see Jonathan R. Kesselman, "Direct Expenditures Versus Tax Expenditures for Economic and Social Policy," in Neil Bruce, ed., *Tax Expenditures and Government Policy* (Kingston, Ont.: Queen's University, John Deutsch Institute for the Study of Economic Policy, 1988), 283-323. In the same volume, Vijay Jog and Jack Mintz, "Business Tax Expenditure Accounts: Their Purpose and Measurement," *ibid.*, 181-225, suggest that this type of relative cost information should also be provided as part of tax expenditure accounts.

¹³ For data on the number of SR & ED claimants, see Canada, *Report of the Auditor General of Canada to the House of Commons 1994*, vol. 16 (Ottawa: Supply and Services, 1994), chapter 32.

that the survey respondents were statistically representative of SR & ED claimants generally.¹⁴

In selecting companies for the survey, we began by approaching a number of associations of companies that engage in R & D (a list of these associations appears in appendix 1). In some cases, the association contacted its members directly and asked for volunteers. In other cases, the association first publicized the study to its members and then provided its membership list to the authors, who selected members at random and contacted them with a request to participate. We wanted to ensure that a reasonable number of the respondents were also receiving federal government grants in support of their R & D. To this end, we obtained from Industry Canada a list of companies that had received funding from the Industrial Research Assistance Program (IRAP) of the National Research Council, selected a number of companies at random from the list, and asked them to participate.

This procedure introduced biases into the sample that placed obvious limitations on the survey. The bias most apparent to the authors was the lack of participation in the survey by very small R & D performers, a lack that occurred presumably because small R & D performers are less likely than larger ones are to participate in industry associations. In addition, associations tended to select members that they believed would be interested in participating. These firms were perhaps more likely than other members to have opinions, positive or negative, about the program.

An additional source of bias was the constraint imposed on the survey by the size of its budget. Thus the need to constrain costs restricted the geographic diversity of the sample, which was limited to companies with head offices in Ontario.¹⁵ Some respondents carried on R & D in other provinces as well, but most of the R & D was based in Ontario. Although the results for companies outside Ontario would not necessarily differ significantly from those for companies in Ontario, it is nevertheless true that the omission of non-Ontario firms meant that some industries in which R & D is important, such as oil and gas and aquaculture, were not represented in the survey.

Finally, it should be noted that the number of firms in the sample size—51—was small. This was so in part because of the commitment of time that the survey required of potential respondents—four to six hours, including the orientation meeting. In addition, some potential respondents

¹⁴ One method of circumventing this problem would be to search databases of financial statements for publicly traded firms that list R & D expenses. This appears to be how the list “Research on a Roll: The R & D Top 100” (September 1994), 11 *Report on Business Magazine* 85 was prepared. This method would, however, exclude corporations that are eligible for refundable SR & ED tax credits. It would also exclude large firms that undertake R & D efforts but that also have other operations, since such firms often lump R & D expenses in with general and administrative expenses on their financial statements.

¹⁵ Most of these head offices were located in Southern Ontario, since orientation meetings were held in Mississauga, Ottawa, Toronto, and Kitchener.

declined to participate because they believed that the results of the study would not have a significant impact on the design or the administration of the SR & ED tax credit program. The smallness of the sample may have created a non-respondent bias; that is, the respondents may not have been statistically representative of the population of SR & ED claimants. Unfortunately, Revenue Canada has not provided the information about this population that is necessary for an assessment of the magnitude of the bias.

For all of these reasons, the survey results may not provide a statistically accurate picture of the compliance costs associated with the SR & ED tax credit program. In particular, the results may not be representative of either the compliance costs incurred or the views held by smaller R & D performers or those outside Ontario. The extent of the non-respondent bias is unknown. On the other hand, the total value of the SR & ED claims filed by the firms in the sample in their most recent federal income tax returns was \$340 million, or about 30 percent of the value of all SR & ED claims in 1992, \$1.14 billion.¹⁶ Also, as we shall discuss in the next section, the respondents did vary widely in terms of industrial sector, size, and other factors.

The survey instrument contained three sets of questions. First, there were questions about the respondent firms themselves—for example, whether they were Canadian or foreign-controlled and whether they were or were not entitled to the 35 percent refundable tax credit. Part V of the version of Revenue Canada's T661 form then in use requested the taxpayer to provide information about its revenues, the number of its employees, and the fields of technology to which its claim applied. We told the respondents that they could satisfy our request for the same information by providing photocopies of their completed T661 forms. This approach turned out to be problematic, since many respondents clearly had either failed to complete part V of the T661 form or had completed it inaccurately. In particular, there were problems with the question that asked for the taxpayer's annual revenue, expressed in thousands of dollars. Some respondents had not answered this question and others had apparently ignored the instruction that the figure be given in thousands of dollars. We were therefore forced to abandon any attempt to characterize the respondents by revenue. We used the number of employees as an alternative measure of firm size.

The second section was the largest part of the survey. It asked about the costs of learning about the SR & ED tax credit program, complying with its requirements on an annual basis, complying with the requirements of a Revenue Canada audit, and complying with the requirements

¹⁶ See Gerry Goodchild and Morley Lipsett, "Patterns of R&D Claims in Canada," paper presented at the Conference on Government Recipes for Industrial Innovation, Vancouver, BC, October 20-21, 1994. Much of this amount cannot be used to reduce tax payable in the current year and is instead carried forward or back. In aggregate, the amount actually used to reduce tax payable in 1991 was \$543 million. See Canada, Department of Finance, *Government of Canada Tax Expenditures* (Ottawa: the department, December 1994), 26.

of various government grant programs for R & D. In order to simplify the exercise for the respondents, we had asked them at the beginning of the survey to estimate the average hourly cost (including incremental overhead) of each of the two types of employees who were involved in compliance with the SR & ED tax credit program or the R & D grant programs, the “technical” employees and the “accounting” employees. The survey defined a technical employee as one who participated in the documentation or assembly of technical information for the SR & ED tax credit claim or the grants. It defined an accounting employee as one who participated in assembling the financial information required for either the SR & ED tax credit program or an R & D grant. The balance of the survey asked respondents to indicate how many hours had been spent by their technical and accounting employees in performing various tasks related to compliance. They were also asked to indicate the amounts paid to outside consultants for performing the same tasks. The conversion of hours spent to cost was part of our subsequent analysis of the survey data.

The third section was relatively brief. It sought qualitative opinions about the compliance costs associated with the SR & ED tax credit and R & D grants. The respondents were asked to rank the cost of the grant or the tax credit program relative to the benefits received on a scale of 1 to 5, where 1 was “low,” 3 was “acceptable,” and 5 was “high.” They were then asked whether, on balance, they believed that the cost, relative to the benefits, of the SR & ED tax credit program was higher than the cost of the R & D grant programs, or vice versa. Finally, they were asked for any other qualitative comments they wished to make about the compliance costs of either SR & ED credits or R & D grants.

Because the focus of the survey was on SR & ED tax credit compliance costs, the questions in the final section on R & D government grant compliance costs were fewer and less detailed. In addition, the fact that tasks involved in complying with the grant programs vary from program to program made it difficult to break the costs down according to particular tasks.

RESPONDENT PROFILE

Of the 111 companies we contacted, 61 agreed to participate in the survey and were sent questionnaires.¹⁷ Of the 61, 52 ultimately returned questionnaires. One questionnaire was disqualified because the company had not yet submitted its first SR & ED tax credit claim (the company had wanted to participate in order to submit its qualitative comments). Table 1 summarizes some of the key characteristics of the respondents.

Of the 51 respondents, 25 had also received an R & D government grant. As we noted above, we used number of employees instead of annual revenue, for which reliable data were not forthcoming, as a measure

¹⁷ Since many of the companies involved are not publicly traded, it is impossible to compare the size or other characteristics of the firms that participated in the survey with those of the firms that declined participation.

of firm size. The median number of total employees by respondent was 143; one-third of the respondents had fewer than 50 employees, and one-third had more than 700. The median number of total R & D personnel was 44; one-third of respondents had 18 or fewer R & D personnel, and one-third had 350 or more. The most common field of technology was information technology; next came various sectors of manufacturing. Because of the above-noted problems with data from the T661 form, however, industry data were not available for all of our respondents. Therefore, cross-tabulations of an industry by other firm characteristics would not be helpful.

As we mentioned earlier, the respondents may not be statistically representative of the population of SR & ED claimants. Unfortunately, Revenue Canada has not provided the information about the population of SR & ED claimants that we need to determine whether the respondents are statistically representative of the population of SR & ED claimants.

SURVEY RESULTS: SR & ED TAX CREDITS

The questionnaire divided compliance costs into annual compliance costs, start-up costs, and audit costs. It defined annual compliance costs as “costs that occur routinely every year” and asked respondents to exclude from this category “costs caused by extraordinary events in the year such as start-up costs or Revenue Canada audits.” The questionnaire defined start-up costs as costs related specifically to the year “in which the reporting entity first applied for tax credits under the SR & ED program.”

We examine each of these three types of costs below.

Annual Compliance Costs

The survey questions categorized the tasks associated with annual compliance costs as follows:

- The determination of SR & ED eligibility and the tracking and technical documentation of eligible projects (question 9).
- The preparation of project descriptions for Revenue Canada form T661 (question 10).
- Tracking SR & ED current costs, such as salaries and materials (question 11).
- If using the proxy method, the compilation of additional cost information. If not using the proxy method, the tracking and allocation of certain overheads and other pooled-type costs (questions 13 & 14).
- Tracking the cost of equipment used all or substantially all for SR & ED projects (question 15).
- Tracking the cost of “part use” capital equipment and determining the portion eligible for credit (question 16).
- The completion of forms in support of the T2 return, such as form T661 (apart from project description) (question 17).

Table 1 Profile of Respondent Firms

Median number of employees	143
Median annual R & D expenditures	\$2.1 million
Respondent firms that were	
Canadian-controlled and entitled to 35 percent refundable SR & ED credits .	41%
Canadian-controlled and entitled only to the 20 percent SR & ED credit ...	31%
foreign-controlled	27%
Respondent firms that were receiving government grants	49%
Respondent firms with	
SR & ED claim of less than \$200,000	22%
SR & ED claim between \$200,000 and \$1 million	46%
SR & ED claim between \$1 million and \$10 million	18%
SR & ED claim of \$10 million or more	14%
Respondent firms engaged in	
information technology	35%
manufacturing	16%
materials technology	8%
biotechnology	6%
energy technology	6%
environmental technology	4%
combination/other	25%

- Tax planning for SR & ED credits (question 18).
- Any other tasks associated with annual costs (question 19).

The questionnaire asked the respondents to report the number of hours in the year that technical employees and accounting employees spent on these nine tasks. As was noted above, we converted these figures into dollar costs by multiplying them by the average hourly cost of such employees, as reported by the respondents. The median average hourly costs for technical employees and accounting employees were, respectively, \$45 and \$35. These figures are not simply wage rates: the respondents were instructed to include benefits and incremental overhead costs.¹⁸ The total compliance cost for each task is the sum of the dollar cost of technical employees, the dollar cost of accounting employees, and the amount paid to consultants.

Approximately one-half (51.2 percent) of the annual compliance costs of all firms combined are associated with the tasks performed by technical employees. The balance of costs is distributed almost equally between accounting employees (24.4 percent) and outside consultants (24.5 percent). The questionnaire did not distinguish between outside consultants who performed technical tasks and outside consultants who assembled financial information, since many consultants might perform both types of tasks. In any event, it was not likely that the requisite information would be available to the respondent. If we assume that the ratio of

¹⁸ Accordingly, they cannot readily be validated from any external source such as census data.

Table 2 Characteristics of Annual SR & ED Tax Credit Compliance Tasks

<i>Panel A:</i> Mean costs of technical and accounting employees as percentages of total costs (excluding the cost of consultants)									
	Q9	Q10	Q11	Q13/14	Q15	Q16	Q17	Q18	Q19
Technical employees	74	75	41	18	26	37	15	10	17
Accounting employees . . .	26	25	59	82	74	63	85	90	83
<i>Panel B:</i> Mean cost of consultants as a percentage of total costs									
	Q9	Q10	Q11	Q13/14	Q15	Q16	Q17	Q18	Q19
	7	13	6	15	5	8	31	36	10

technical consultants to accounting consultants is roughly the same as the ration of technical employees to accounting employees, then approximately two-thirds of total compliance costs relate to technical employees and one-third to accounting employees.

As the first panel of table 2 shows, there is a fairly clear division of tasks between technical employees and accounting employees. Technical employees account for about three-quarters of the costs (excluding the cost of consultants) related to the determination of SR & ED eligibility and technical documentation (question 9) and to writing project descriptions (question 10), and accounting employees account for most of the costs associated with all of the other annual compliance tasks (questions 11 to 19).

Panel B of table 2 shows that the firms surveyed used consultants for all nine of the annual compliance tasks, but that they devoted more resources to hiring consultants for accounting-oriented tasks such as tax planning (question 18) than to hiring consultants for technical tasks such as determining SR & ED eligibility (question 9).

Panel A of table 3 shows that about two-thirds of the costs of all of the firms in the sample related to three tasks: determining SR & ED eligibility and preparing technical documentation; preparing project descriptions; and tracking SR & ED current costs. The percentage of costs related to filling out forms was relatively low (11 percent).

The allocation of compliance costs among the nine tasks varied significantly with the size of the R & D claim. Firms with SR & ED credits of less than \$200,000—which, as we shall show below, have relatively high total annual compliance costs—incurred a high proportion of their total costs in two areas. The first was the tracking of SR & ED current costs (question 11), which accounted for 26 percent of these firms' costs and 17 percent of other firms' costs. The second area was the completion of forms related to the T2 return, apart from the project descriptions in the T661 (question 17); it accounted for 13 percent of the costs of firms with claims under \$200,000, 15 percent of the costs of firms in the \$200,000 to \$1 million category, and only 5 percent of the costs of firms with SR & ED claims of over \$1 million. It is possible that the cost of filling

Table 3 Mean Cost by Task, as a Percentage of Total Costs, of Annual SR & ED Tax Credit Compliance

<i>Panel A: all firms</i>										
	Q9	Q10	Q11	Q13/14	Q15	Q16	Q17	Q18	Q19	Total (and number of firms)
	19	27	19	7	5	1	11	8	3	100 (51)
<i>Panel B: SR & ED claim</i>										
	Q9	Q10	Q11	Q13/14	Q15	Q16	Q17	Q18	Q19	Total (and number of firms)
<\$200K	19	26	26	7	4	0	13	5	0	100 (11)
\$200K-\$1M	12	28	19	8	4	1	15	12	2	100 (23)
\$1-10M	30	25	17	8	4	0	7	4	3	100 (9)
>\$10M	26	33	12	8	7	4	2	5	2	100 (7)
<i>Panel C: annual compliance cost</i>										
	Q9	Q10	Q11	Q13/14	Q15	Q16	Q17	Q18	Q19	Total (and number of firms)
<\$10K	13	26	15	8	5	0	18	8	5	100 (18)
\$10-\$25K	16	24	26	8	4	1	11	11	0	100 (14)
\$25-\$100K	19	37	21	7	4	1	6	5	1	100 (13)
>\$100K	43	19	8	6	8	4	2	6	4	100 (6)

out forms is a fixed cost—one that does not vary very much with the size of the credits claimed.

Larger firms that have high compliance costs seem to have them for different reasons. Consider the six firms in our sample that reported annual compliance costs of over \$100,000. Panel C of table 3 shows that these firms differed from the other firms largely in the area of costs related to the determination of eligible projects and the technical documentation of these projects (question 9). On average, these firms incurred fully 43 percent of their total compliance costs in this area, whereas the average for the other firms was 16 percent. The relative cost of tracking “part-use” equipment was also higher for these firms (4 percent of total costs) than it was for the firms with smaller overall costs (1 percent or less). One might hypothesize that these firms’ large annual compliance costs are attributable to the practice of hiring consultants who promise to identify creditable SR & ED costs in return for a large percentage (for example, 50 percent) of the credit. In fact, however, the proportion of annual compliance costs that consists of payments to consultants is only slightly larger for these firms (24 percent) than it is for other firms (22 percent).

Aggregate Annual Compliance Costs

Aggregate annual compliance costs for all 51 firms in the sample were about \$2.5 million. Although the sample may not be statistically representative, this figure does give some idea of the total compliance costs associated with

the SR & ED program, since, as we noted above, the firms in the sample account for about 30 percent of total SR & ED claims in Canada.

The value of aggregate SR & ED claims for the sample is \$340 million; thus the annual compliance costs of \$2.5 million amount to just 0.7 percent of SR & ED credits claimed. Although there is no absolute standard against which to measure compliance cost figures, this figure is surprisingly low, given the amount of compliance effort that the SR & ED program requires.

We did not gather any data about provincial SR & ED incentives and their associated compliance costs. The task of claiming the provincial tax incentives, however, requires little effort beyond transferring the appropriate numbers from the federal forms. The only additional information required is the amount of SR & ED activity carried out in the province concerned. Moreover, as table 3 shows, form-filling accounts for only about one-ninth of the aggregate annual compliance costs for federal SR & ED incentives. So, although it is not possible here to calculate the actual value of the provincial incentives¹⁹ and their associated compliance costs, it is reasonable to suppose that if these amounts were factored into the annual compliance cost ratio reported above the result would be even less than 0.7 percent.

The figure for the compliance costs for all of the firms in the sample conceals significant variation among the firms. The compliance costs in the sample range from just over \$2,000 to over \$680,000. The SR & ED credits claimed range from under \$10,000 to over \$100 million. Compliance costs vary from 0.1 percent of SR & ED credits claimed to 164 percent.

Table 4 separates annual compliance costs into four categories according to the size of the SR & ED claim. As one might expect, annual compliance costs increase with the amount of SR & ED credits claimed. The increase in costs, however, is far from being proportionate to the amount of the claim. For companies with an SR & ED claim of less than \$200,000 on their most recent tax return, annual compliance costs are on average almost 30 percent of credits claimed. For companies with SR & ED credits of between \$200,000 and \$1 million, annual compliance costs fall sharply, to an average of 4.3 percent of credits claimed. As SR & ED credits rise to between \$1 million and \$10 million, compliance costs fall again, to an average of 2.8 percent of credits claimed. For the firms in our sample with over \$10 million in SR & ED claims, annual compliance costs are on average just 0.9 percent of credits claimed.

Even within these claim-size categories, there is a pronounced tendency for annual compliance costs to fall as a percentage of SR & ED claims as one nears the top end of the category. This tendency is reflected in the weighted means shown in table 4. If in calculating the mean across

¹⁹For example, in order to calculate the Ontario superallowance, one would have to know the amount of SR & ED carried out in Ontario and have some information on past years' SR & ED activity.

Table 4 Annual Compliance Cost as a Percentage of SR & ED Credits Claimed, by SR & ED Claim Size

Size of SR & ED credit claim	Number of firms ^a	Mean annual compliance cost (\$)	Mean SR & ED credit claim (\$)	Cost as a percentage of claim		
				Mean	Weighted mean ^b	Median
<\$200K	11	12,217	67,156	29.5	18.2	14.6
\$200K-\$1M	23	16,372	450,626	4.3	3.6	2.9
\$1-10M	9	50,376	3,281,558	2.8	1.5	2.1
>\$10M	7	219,160	45,099,742	0.9	0.5	0.7
All firms	50	49,132	7,126,707	9.1	0.7	2.8

^a One firm is not included in the size classification because it did not provide the amount of its SR & ED credits. ^b For an example of the calculation of the weighted mean, consider the first line of the table: mean annual compliance costs of \$12,217 divided by the mean SR & ED claim of \$67,156 yields 18.2 percent.

firms within a size category one uses the amounts of SR & ED credits as weights, the mean is significantly reduced. For firms in the largest claim-size category, for example, the average compliance cost is 0.9 percent of SR & ED credits claimed, whereas the weighted average is only 0.5 percent.

Since extreme values can influence the mean, it is also useful to examine the median values for the various claim-size groups. The median falls uniformly as the credit size gets larger, just as the mean does. The influence of extreme values is well illustrated by the group of firms that claim the smallest credits: the median value (14.6 percent) is only one-half of the mean value (29.5 percent).

The fact that compliance costs are less than 1 percent of total credits claimed may be expected to give policy makers and SR & ED claimants some satisfaction. On the other hand, it is troubling that the group of firms that claim the smallest credits face annual compliance costs equal to from 15 to 30 of the credits they claim. The reasons why costs rise so sharply as credits decrease are not clear. One hypothesis is that a firm with large SR & ED claims can get Revenue Canada approval for its top-level framework and thereby avoid providing detailed justifications of individual projects, whereas a firm with smaller claims may have a wider diversity of projects and therefore cannot achieve these economies. If this hypothesis were valid, however, one would expect the proportion of costs associated with the technically orientated tasks identified in our survey (questions 9 and 10) to decline as claims increase. Yet table 3 has shown that, if anything, the reverse is true. As we noted above, the principal claim-size-related differences in costs are that for firms with SR & ED credits of less than \$200,000 an unusually high proportion of compliance costs are associated with the tracking of SR & ED current costs and with the completion of forms related to the T2 return (not including project descriptions required for the T661).

Another possible explanation for the fact that firms with small claims have relatively high compliance costs is that they employ consultants

who charge high rates for filing SR & ED claims. There is no obvious relation, however, between the percentage of compliance costs related to consultants and claim size. About 17 percent of the costs of firms with claims of less than \$200,000 relate to consultants; for firms with claims of between \$200,000 and \$1 million, the figure is 30 percent. For the \$1-to-10-million and over-\$10-million classes, the figures are, respectively, 5 percent and 22 percent.²⁰

One variable apart from claim size that may explain some of the variation in annual compliance costs across firms is “firm status”: a firm may be either eligible for the 35 percent refundable SR & ED tax credit, Canadian-controlled but not eligible for the refundable credit, or foreign-controlled. This variable may be relevant because Revenue Canada’s treatment of firms that claim refundable credits is somewhat different from its treatment of other firms. Refundable credits are cash payments, and Revenue Canada will not make cash payments without some evidence of a valid claim. Therefore, claims for refundable credits are generally audited more quickly than are other SR & ED credit claims.²¹

Table 5 analyzes total annual compliance costs in terms of firm status. The costs for firms that are eligible for the refundable credit are on average equal to 17 percent of SR & ED credits, whereas the figure for other Canadian-controlled firms is only 2.8 percent and the figure for foreign-controlled firms only 5.6 percent. The differences reported in table 5, however, may be simply a result of differences in the average SR & ED claim size. The firms that are eligible for the refundable credit have on average about \$400,000 in credits, whereas the foreign-controlled and other Canadian-controlled firms in the sample have on average \$7 million and \$16 million in credits, respectively.

Another variable, apart from claim size and firm status, that may influence annual compliance cost is firm size. A standard finding in the compliance-cost literature is that small businesses bear a disproportionate share of compliance costs.²² Table 6 shows the effect of firm size on the compliance costs of SR & ED claims, using the number of employees as a measure of firm size. As expected, the annual compliance costs of large firms are smaller as a percentage of claims than are the costs of small firms. The difficulty with this finding is that large firms also tend to have larger SR & ED claims, so it is not clear which is the determining variable.

²⁰ Another possibility is that some small firms included start-up costs in their responses to the annual compliance cost questions (Q9 to Q19). This seems unlikely, however, given the definition of annual compliance costs provided in the questionnaire (as described above).

²¹ See Roy Shultis, “Revenue Canada’s Administration of R & D Tax Incentives: Overview of Current Administrative Practices,” in *Report of Proceedings of the Forty-Fourth Tax Conference*, 1992 Conference Report (Toronto: Canadian Tax Foundation, 1993), 33:1-11.

²² In particular, see the studies by Pope et al. and Sandford et al. cited in footnote 4, *supra*.

Table 5 Annual Compliance Cost as a Percentage of SR & ED Credits Claimed, by Firm Status

	Number of firms	Mean annual compliance cost (\$)	Mean SR & ED credit claim (\$)	Cost as a percentage of claim	
				Mean	Weighted mean
Refundable	21	22,033	407,971	16.6	5.4
Other Canadian . .	16	72,710	15,609,723	2.8	0.5
Foreign	14	62,835	7,030,024	5.6	0.9

Table 6 Annual Compliance Cost as a Percentage of SR & ED Credits Claimed, by Firm's Number of Employees

Number of employees	Number of firms	Mean annual compliance cost (\$)	Mean SR & ED credit claim (\$)	Cost as a percentage of claim	
				Mean	Weighted mean
<100	19	19,595	381,908	7.2	5.1
100 to 1,000	13	17,771	581,862	5.6	3.1
>1,000	13	126,900	25,413,945	2.1	0.5

In order to determine the relative contributions of claim size, firm status, and firm size to the variation in compliance costs across firms, we performed a multiple regression analysis. This type of analysis allows the researcher to measure the contribution of any particular factor while statistically controlling for the contributions of other factors. The results of this analysis, which we report in appendix 2, indicate that claim size is the determining variable. Neither firm size nor firm status makes a significant independent contribution to explaining the variation in compliance costs across firms.

The regression analysis also yields an estimate of the quantitative relationship between annual compliance costs and claim size: a doubling of claim size causes annual compliance costs to increase by 44 percent. In other words, a doubling of claim size results in less than a doubling of annual compliance costs. This non-linear relationship explains why firms with small claims have annual compliance costs that are relatively large in proportion to claim size.

Start-Up Costs

Respondents were asked about the costs of learning about and designing systems for the tax credit program when they first started to use it. Not all respondents could complete this section, either because they had been continuously claiming tax credits since before 1986²³ or because the individuals who completed the survey did not have access to information

²³ Note that in 1986 the federal government made major changes in the SR & ED program. For the purposes of this study, therefore, we treated 1986 as the first year of a "new" SR & ED program and sought no data for earlier years. We did not adjust start-up costs for inflation, since for most firms the start-up year is quite recent.

about start-up costs in an earlier year. Thirty-three respondents were able to provide start-up information.

Average start-up costs for the 33 firms with a start-up year were \$32,556. Since the annual compliance costs for this group of firms averaged \$38,720, start-up costs were almost as large (84 percent) as are annual compliance costs. In effect, a firm has a “double year” of compliance costs in its start-up year—one year’s worth of compliance costs and an almost equal amount of start-up costs. Nevertheless, total start-up costs were only 0.4 percent of the total SR & ED credits claimed by these firms in their most recent returns.

The respondents attributed 77 percent of the total start-up costs to learning about the SR & ED tax credit program and training staff and the remaining 23 percent to the cost of setting up new forms and systems to capture the necessary information.

Start-up costs bear disproportionately on smaller firms, but not to the same extent as annual compliance costs do. The median values for start-up costs as a percentage of SR & ED claims are 3.5 percent for claims under \$200,000, 1.8 percent for claims between \$200,000 and \$1 million, 1.15 percent for claims between \$1 and \$10 million, and 0.6 percent for claims over \$10 million.

Anecdotal evidence had suggested that compliance with the SR & ED tax credit program may bring certain benefits, such as better management and tracking of R & D activities. Accordingly, the survey asked whether the costs of the start-up activities for the SR & ED tax credit program had produced any benefits in terms of the effectiveness of managing the R & D function. Thirty-one percent of the respondents (16 firms) answered yes. Those who did were also asked what percentage of their start-up costs would have been incurred if only those benefits had been achieved (in other words, if they had not also had to comply with the SR & ED tax credit program). Two-thirds of these respondents reported that 20 to 25 percent of the costs incurred would have achieved only the management benefits; the rest reported a higher percentage.

Payments to outside consultants account for about one-half of start-up costs but only about one-quarter of annual compliance costs. This finding suggests that respondents may have gone to consultants for help to get them started in the program but that the consultants became less necessary once the respondents had acquired experience with the program.

Revenue Canada Audit Costs

Respondents were asked to report on the status of their R & D tax credit claims since 1986. They were asked, among other things, whether they had been audited, whether the audit had been completed, and whether they had proceeded to a notice of objection. As table 7 shows, a very high proportion of respondents reported that they had undergone or were likely to undergo a technical or Revenue Canada cost audit of their SR & ED tax credit claim for each of the years reported. Note that respondents who did

Table 7 Percentage of Respondents Undergoing Revenue Canada Audit

Year	Technical audit	<i>percent</i>	Financial audit
1986	88		96
1987	80		93
1988	85		97
1989	85		97
1990	84		84
1991	92		79
1992	74		76
1993	73		84

not know whether an audit had been or would be conducted for a particular year are not included in these percentages. Most of the respondents had undergone two or three separate R & D tax credit audits since 1986, some of which may have related to more than one year. The audit percentages appear to be dropping in recent years; perhaps firms that have established a good track record with Revenue Canada are no longer being audited with the same frequency.

Respondents were then asked about the costs of complying with their most recent SR & ED tax credit audit. Average audit costs per year audited were \$6,458. This amount represents 12.5 percent of average annual compliance costs and 0.1 percent of average SR & ED claims for the sample group of firms. The fact that audit costs are much smaller than annual compliance costs keeps the compliance costs of the SR & ED program low in spite of an audit rate that approaches 100 percent. Clearly, the SR & ED program is like no other part of the Canadian tax system in terms of its audit rates.

Audit costs are slightly more important for smaller firms than for larger ones, but this relationship is not strong. The median values of audit costs as a percentage of SR & ED claims are 1 percent for claims under \$200,000, 0.4 percent for claims between \$200,000 and \$1 million, 0.2 percent for claims between \$1 and \$10 million, and 0.02 percent for claims over \$10 million.

In spite of anecdotal indications and written comments in response to the final survey question to the effect that SR & ED tax credit audits are very onerous for taxpayers, the mean reported cost of an audit is only a fraction of the mean annual compliance cost of the tax credit program. This may so be because several employees participate in the annual tax credit filing but only one or two employees deal with the Revenue Canada audit. Dissatisfaction with the audits may be attributable to their frequency, to their adversarial nature, or perhaps to the perception that they are a waste of the respondent's time.

Respondents were also asked about the results of their most recent SR & ED tax credit audit. On average, the audit allowed 90 percent of the tax credits in the original claim. The firms with the smallest SR & ED

claims did substantially better than that: they were allowed on average 98 percent of the original claim. Forty-three percent of the respondents who reported a disallowance of tax credits said that the reason for the disallowance was ineligible costs, 17 percent said that the reason was ineligible projects, and 26 percent cited both ineligible costs and ineligible projects. The finding that ineligible costs are more common than ineligible projects may be evidence of progress in defining the inherently somewhat subjective concept of R & D. On the other hand, a dispute over the eligibility of costs may involve a relatively small dollar amount (thus a dispute over costs may turn on questions such as whether training costs are eligible or whether too high a proportion of the cost of shared-use equipment has been allocated to SR & ED), whereas a Revenue Canada opinion that a project is not SR & ED could eliminate all of the costs of the project from the credit. It may be that where substantive amounts are involved there are about as many reassessments for ineligible costs as there are for ineligible projects. If this were so, there would be no indication of progress in defining R & D.

Respondents were also asked about any SR & ED tax credit claims that had gone beyond the audit stage to a notice of objection or further. Only 11 of the respondents reported pursuing a tax credit claim past the audit stage, and, not surprisingly, the costs of the exercise varied widely.

Total Compliance Costs

There is little point in trying to add up annual compliance costs, start-up costs, and audit costs to arrive at an aggregate measure of compliance costs. The latter two costs are much less important than the first, and in any case a sum of the three costs would probably not be meaningful. This is so for several reasons. First, it is difficult to compare start-up costs with annual compliance costs and audit costs, since start-up costs occur only once whereas annual compliance costs and audit costs (as will be discussed below) occur every year. In economic terms, start-up costs are a “stock” and annual compliance costs are a “flow.” Second, audit costs tend to vary significantly from year to year, and the year of the last audit may not have been a “typical” year. Third, the sample was small to begin with and the samples for start-up costs and audit costs would be even smaller, since many firms did not provide the requisite information.

Qualitative Assessments

The respondents were asked to rate the compliance costs of the SR & ED tax credit program, relative to the benefits received, on a scale of 1 to 5 where 1 was “low,” 3 was “acceptable,” and 5 was “high.” The most common response, given by 43 percent of the respondents, was “acceptable.” In addition, 16 percent thought the compliance costs were low and another 12 percent put them between low and acceptable. Thus almost three-quarters (73 percent) of the respondents felt that the compliance cost levels were acceptable or better. The remainder viewed the costs as either high (14 percent) or between acceptable and high (12 percent).

An attempt was made to use a multiple regression analysis to statistically determine the factors that might explain the variation in the respondents' views. The only significant finding was that respondents whose firms were eligible for refundable credits rated the compliance costs lower (by about three-quarters of a point on average) than did respondents whose firms were not eligible. Apparently, firms that receive cash payments for the tax credits perceive the benefits of the SR & ED program more positively and therefore rate the compliance costs lower relative to the benefits. In any event, a great deal of the variation of this variable remains unexplained.

SURVEY RESULTS: R & D GRANTS

Compliance Costs

About one-half (25) of the respondents reported receiving R & D government grants. Since R & D grant programs vary greatly in how much assistance they provide and how much planning detail they require for a proposal, the respondents were instructed to select one particular grant for analysis. For approximately one-third of the respondents this was an Industrial Research Assistance Program (IRAP) grant, and for another one-third it was a Defence Industries Productivity Program (DIPP) grant. The balance selected one of a variety of government grants. On average, 41 percent of the project costs were covered by the grant. All of the grant recipients claimed SR & ED tax credits on the balance of the R & D cost.

The grant recipients were asked to estimate the cost of complying with the grant programs, using measurement criteria similar to those used for the SR & ED compliance-cost calculation.²⁴ On average, the respondents reported that they succeed in getting about 66 percent of the grants they apply for. The mean cost of learning about eligible grants across all respondents was \$3,369. Sixty percent of this cost was associated with technical employees of the respondent. These figures may not be representative of unsuccessful grant applicants, however, since we skewed our sample selection procedure toward successful applicants. We did this to ensure that we would have a sample of grant recipients large enough to permit an analysis of the compliance costs of administering grants.

On average, almost three-quarters (72 percent) of the compliance costs associated with a grant are attributable to the proposal and application stage. The tasks of tracking expenditures, providing reports, negotiating the direction of research and the like account for a further 23 percent. Audits by the granting agency account for a further 4 percent of the total, and "other" costs account for 1 percent. Approximately one-quarter of the costs are associated with accounting employees of the respondent, and

²⁴ Insofar as applying for a grant is a voluntary choice, these costs may not be considered "compliance costs." Application for an SR & ED tax credit, however, is equally a voluntary choice—subsection 127(5) of the Income Tax Act, RSC 1985, c. 1 (5th Supp.), as amended, permits a taxpayer to claim SR & ED credits and other investment tax credits but does not require it.

the balance is split between technical employees (39 percent) and outside consultants (34 percent).

Of the 25 firms that had received grants, 22 supplied detailed compliance cost data. For these 22 firms, the compliance costs were equal on average to 2 percent of the grants received. The same 22 firms' compliance costs for the SR & ED program were equal on average to 2.2 percent of the credits received. One must be cautious about drawing the conclusion, on the basis of this slight difference, that grants involve lower compliance costs than do SR & ED tax credits. The data refer only to the successful grant applicable in the sample. Since 72 percent of these firms' compliance costs were incurred in the proposal or application stage, the compliance costs would be much higher if one included the compliance costs incurred by the unsuccessful applicants. Moreover, the 22 firms for which we have grant-compliance cost data are not among the firms in the sample with the lowest SR & ED tax credit compliance costs. Perhaps the firms that apply for grants are self-selected to be firms for which obtaining SR & ED tax credits is relatively costly.

Table 8 shows how the compliance costs associated with grants vary with the size of the firm's most recent SR & ED claim. As a percentage of the grant, these costs are substantially higher for firms with small claims than for firms with large claims. If one weights the result by grant size, the compliance costs for firms with an SR & ED claim of less than \$1 million are equal to 3.4 percent of the grant amount, whereas for firms with larger SR & ED claims the figure is only 1.0 percent.

Qualitative Assessments

Respondents who had received R & D grants were also asked to assess the compliance costs associated with those grants, relative to the benefits received, on a scale of 1 to 5 where again 1 was "low," 3 was "acceptable," and 5 was "high." The most common response, offered by 47 percent of the respondents, was "acceptable." None of the respondents, however, thought the costs associated with the grants were low, and only 6 percent of them viewed these costs as being between low and acceptable. Thus only 53 percent of the grant recipients thought the costs associated with grants acceptable or low, whereas 73 percent of all respondents thought that the costs associated with SR & ED credits were acceptable or low.

CONCLUSIONS

Our main finding here has been that despite the reputedly extensive financial and technical record-keeping required to support an SR & ED claim the annual compliance costs associated with SR & ED credits appear to be relatively low in aggregate: they amounted to only 0.7 percent of the total credits claimed by the 51 firms in our sample. In the case of this sample, at least, it appears that the SR & ED program is cost-efficient in delivering support to research and development. The sample, however, is unavoidably non-random, and hence one must be cautious about generalizing to the population. Because of its limited geographic scope, the sample

Table 8 Annual Compliance Cost of R & D Grants as a Percentage of Grant Received, by SR & ED Claim Size

Size of SR & ED claim	Number of firms	Mean annual compliance cost (\$)	Mean grant claim (\$)	Cost as a percentage of grant	
				Mean	Weighted mean
<\$1 million	16	21,087	622,377	9.6	3.4
>\$1 million	6	23,332	2,377,875	0.8	1.0
All Firms	22	21,700	1,101,149	7.2	2.0

also excludes certain industrial sectors. The negative impact of the sampling deficiencies is diminished somewhat by the fact that the sample accounts for fairly large proportion of the dollar value—about 30 percent—of total claims under the SR & ED program.

One troubling finding is that the annual compliance costs of firms with small R & D programs are substantially higher than those of firms with larger programs. Although on average the costs associated with an SR & ED claim amount to less than 1 percent of the claim, the costs for firms with claims of less than \$200,000 can be 15 percent or more of the amount claimed. It should be noted, however, that the effect of the methodological shortcomings of the survey is probably greatest for this segment of the sample. One should be very cautious, therefore, in extrapolating from these particular findings to the population in general.

The survey did provide some information about what aspects of compliance with the SR & ED program generate the greatest costs. For example, it would appear that the tasks of tracking current costs and completing forms cost much the same for all firms and thus put a proportionally greater burden on smaller firms. Start-up costs approximate (or are slightly lower than) annual compliance costs. Although start-up costs are not great in themselves, their effect is to confront firms with a double compliance burden in the first year of the program. Again, the burden is felt disproportionately by smaller firms (and again the caveat against extrapolation applies). Outside consultants seem to be important in the start-up phase and become less significant as a source of compliance costs over time. The survey offered some support for anecdotal evidence that benefits accrue to overall management practices as a result of the introduction of the SR & ED program; however, the number of respondents who reported such benefits was small, and there are obvious risks in generalizing from these results.

Participants in the SR & ED program frequently complain about the “burden” of audits; in the orientation meetings, for example, this burden was a recurring theme. The reported audit compliance costs, however, are significantly lower than the annual compliance costs. It is possible that complaints have more to do with the frequency and length of the audit process than the actual compliance cost as such. In general, a high proportion of tax credits are allowed upon audit; there is no evidence of the debacle of the earlier R & D tax program.

A comparison of SR & ED compliance costs with the compliance costs for R & D grant programs provided ambiguous conclusions. Although the compliance costs associated with grants were lower for firms that received both grants and credits, the larger firms in our sample, which generally had very low SR & ED compliance costs, were not in receipt of grants. Moreover, our calculation of the compliance costs related to grants did not take into account the cost of unsuccessful grant proposals—an important omission, given that most of the costs are incurred at the proposal or application stage. The compliance costs showed an obvious size effect: the costs for firms with small R & D efforts were greater as a percentage of the grant amount than the costs for firms with larger R & D programs.

Even in the best of circumstances, the opinions elicited by a survey about the appropriateness of the costs of complying with a given program should be interpreted with caution. Such opinions may say more about the respondents' views of the program as a whole than about their sense of the relative appropriateness of the actual cost. Nevertheless it is interesting that most of respondents to our survey appeared to find the compliance costs of the SR & ED program to be at least acceptable. Moreover, those who also participated in a grant program tended to be more favourably disposed to the relative compliance costs associated with the SR & ED program than to the costs associated with the grant program.

It would be useful to perform a follow-up study of the respondents whose reported compliance costs were very high relative to those of other respondents to determine whether they have characteristics in common, such as poor R & D project management systems or relatively high degrees of reliance on outside consultants in preparing claims. Respondents who reported relatively low compliance costs would also be worth further study with a view to determining how they have achieved these cost savings. Finally, it would be interesting to compare Revenue Canada's SR & ED tax credit compliance costs with those reported by the respondents, to see whether the respondents who reported high compliance costs also cost Revenue Canada higher than average amounts in terms of department hours spent and outside consultants used.

APPENDIX 1: INDUSTRY ASSOCIATIONS THAT PROVIDED THE NAMES OF POTENTIAL RESPONDENTS

- Aerospace Industries Association of Canada
- Canadian Bankers Association
- Canadian Chemical Producers' Association
- Computer Technology Network Kitchener-Waterloo
- Information Technology Association of Canada
- Mississauga Technology Association
- Motor Vehicle Manufacturers Association
- Ottawa-Carleton Economic Development Corporation
- Toronto Technology Network
- York Technology Association

Table 9 Regression Equations for Annual Compliance Costs of SR & ED Credits

<i>Panel A: initial equation</i>			
Explanatory variable	Expected sign	Coefficient	t-statistic
CLAIM	+	0.293	1.718
EMP	-	0.206	1.426
RD80	-	0.588	1.436
R	?	-0.759	0.222
NRF	?	0.002	0.001
RDUM	?	0.100	0.373
NRFDUM	?	0.019	0.114
Intercept	4.29		
Standard error	0.86		
R-square	0.60		
Adjusted R-square	0.50		
F-statistic	6.36		
N	37		
Dependent variable			
Mean	9.73		
Standard deviation	1.23		
<i>Panel B: final equation</i>			
Explanatory variable	Expected sign	Coefficient	t-statistic
CLAIM	+	0.437	7.229
Intercept	4.00		
Standard error	0.88		
R-square	0.52		
Adjusted R-square	0.51		
F-statistic	52.26		
N	49		
Dependent variable			
Mean	9.85		
Standard deviation	1.27		

APPENDIX 2: MULTIPLE REGRESSION ANALYSIS OF ANNUAL COMPLIANCE COSTS

In order to determine the relative contributions of the various factors that affect annual compliance costs, a regression equation was estimated. The equation has as a dependent variable the natural logarithm of annual compliance cost. The independent variables are as follows:

- CLAIM: the natural logarithm of the amount of SR & ED credits claimed.
- EMP: the natural logarithm of the number of employees of the firm.
- RD80: a dummy variable that assumes the value of 1 if the proportion of the firm's employees involved in R & D (including support staff) is 80 percent or more.
- R: a dummy variable that assumes the value of 1 if the firm is eligible for refundable SR & ED credits.

- NRF: a dummy variable that assumes the value of 1 if the firm is foreign-controlled.
- RDUM: the product of R and CLAIM.
- NRFDUM: the product of NRF and CLAIM.

The variable EMP is expected to have a negative sign, since larger firms would be expected to have more experience with tax compliance work in general.

The variable RD80 is intended to capture the idea that compliance is much simpler for a firm whose sole business is R & D. A firm that also has many non-R & D activities faces the difficult allocation and tracking problem of sorting out which activities and costs are eligible and which are not.

R and RDUM are dummy variables related to refundable-credit firms. They allow the intercept and slope (with respect to CLAIM), respectively, to differ from the intercept and slope in the base case of a Canadian-controlled firm with non-refundable credits. Similarly, the variables NRF and NRFDUM are intercept and slope dummies for foreign-controlled firms.

Revenue Canada's form T661 asks the firm to identify the type of activity or industry to which the R & D effort refers. We considered using type of activity as a variable but decided that it was insufficiently precise. For example, research in pollution control could be an attempt by a manufacturer to solve the firm's own problems with shop-floor people, or it could be an attempt by a little high-tech company to develop pollution control technologies.

The use of natural logarithms with the dependent variable and the size-related independent variables is standard in this literature.²⁵ In particular, the existence of a non-linear relationship of this kind between compliance costs and claim size is suggested by table 4: mean annual compliance costs, expressed as a percentage of the claim, diminishes as the claim increases.²⁶

Panel A of table 9 gives the regression results. None of the variables are significant at the 0.05 level, although the coefficient related to the claim size is close to being significant and is also of the expected sign. The coefficient related to whether 80 percent or more of the firm's employees are associated with R & D is of the wrong sign, as is the coefficient related to the size of the firm. The R-squared value is 60 percent.

²⁵ See, for example, Slemrod and Blumenthal, "The Compliance Cost of Taxing Foreign-Source Income," supra footnote 4, and Vaillancourt, *Administrative and Compliance Costs*, supra footnote 3, at 69.

²⁶ Less satisfactory results were obtained from other functional forms that do not require a constant elasticity of annual compliance costs with respect to total claims. One such form tried is annual compliance cost per dollar of claim as the dependent variable together with non-logarithmic versions of the independent variables described above.

Since none of the coefficients in this equation proved to be statistically significant, we reduced the set of variables in a stepwise fashion until all of the variables were significant. As Panel B of table 9 shows, only the natural logarithm of the SR & ED claim remained in the equation at that point. The R-squared of this equation, 0.51, is little reduced from the initial 0.60. These R-squared values are not strictly comparable, however, since the number of observations has increased from 37 to 49.²⁷ The implication of these results is that size is the only significant determinant of annual compliance costs. The coefficient 0.437 is the elasticity of annual compliance cost with respect to SR & ED claims. In other words, a 100 percent increase in the SR & ED claim produces a 44 percent increase in annual compliance costs. Therefore, annual compliance costs increase, but less than proportionately, as the SR & ED claim increases.

²⁷ The variables EMP and RD80 have a number of missing values, since both are derived from the T661 form. As we discussed earlier, the data provided on this form were not of high quality.