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TREASURY BOARD SECRETARIAT

BENEFIT-COST ANALYSIS GUIDE FOR REGULATORY PROGRAMS

PREPARED BY
CONSULTING AND AUDIT CANADA
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Canada The word "Canada" in a serif font, with a small red maple leaf logo above the letter "a".

Consulting and Audit Canada (CAC) provides a wide range of services relating to regulatory issues. In addition to publishing the Regulatory Affairs Series, these include:

- assistance with the development of Regulatory Impact Assessments for major projects;
- courses on regulatory impact analysis, alternatives to regulation, benefit/cost analysis and compliance issues;
- audits of regulatory programs for conformity with Canada's Regulatory Policy and/or as a baseline evaluation of the management framework for regulatory programs;
- assistance in designing and implementing management processes and guidelines (manuals) for regulatory programs;
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The Regulatory Affairs Division of the Treasury Board Secretariat co-sponsors these publications as part of its mandate to support implementation of the government's Regulatory Policy. The Policy aims to ensure that:

- regulations are enacted or retained only when they are needed to respond to identified problems;
- benefits to Canadians are maximized in relation to costs; and
- regulatory programs are managed in the interests of all Canadians.

Also available in the Regulatory Affairs Series are the *RIAS Writer's Guide* and the *A Strategic Approach to Developing Compliance Policies*. These documents can be downloaded from the website of Regulatory Affairs and Orders in Council Secretariat, Privy Council Office at:

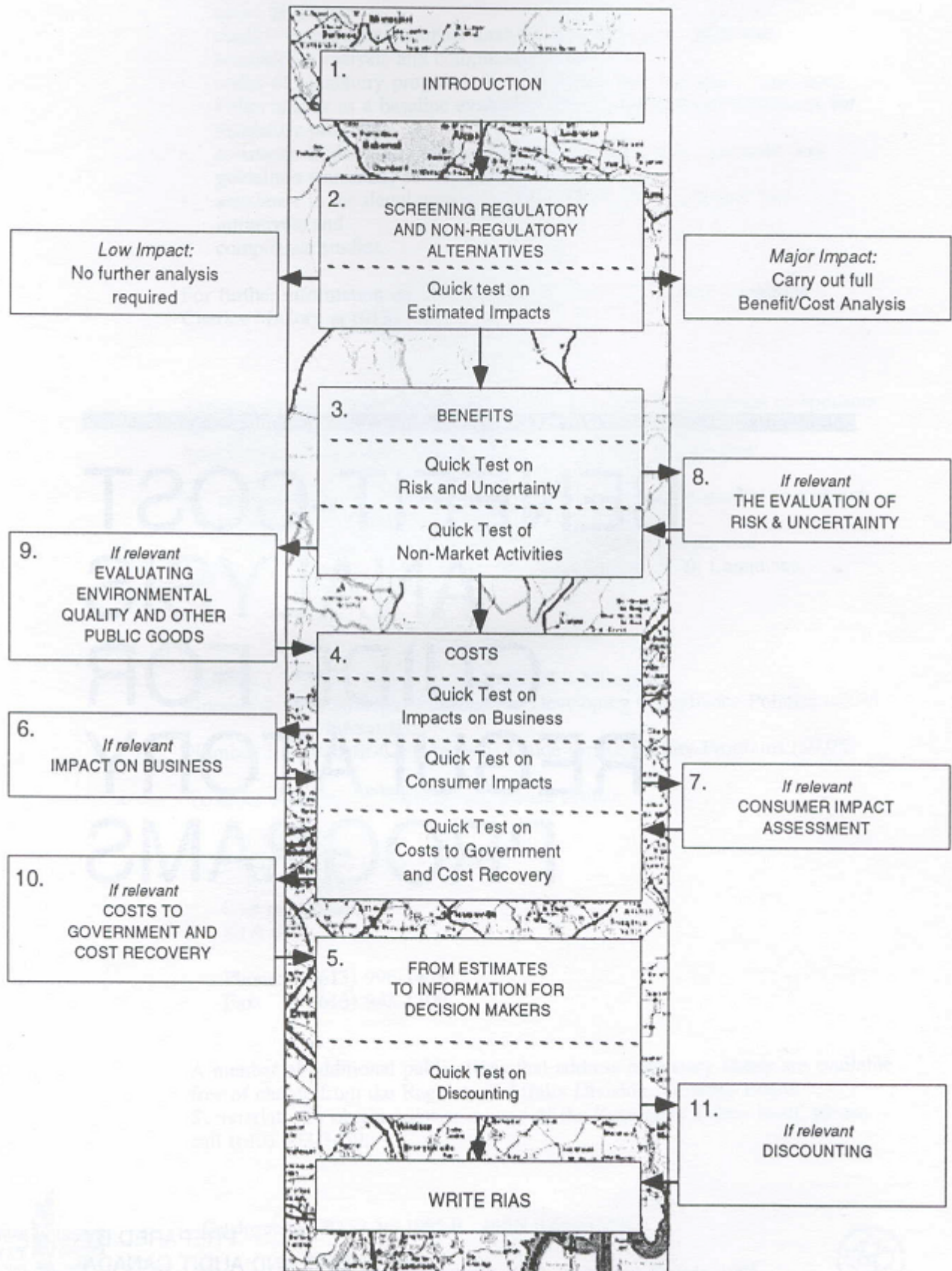
<http://www.pco-bcp.gc.ca/raoics-srdc/default.asp?Language=E&Page=Publications&Sub=Current>

A number of additional publications that address regulatory issues are available free of charge from the Regulatory Affairs Division, Treasury Board Secretariat. To obtain a list or a copy of the Regulatory Policy itself, please call (613) 952-3459.

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A ROAD MAP TO THE KEY POINTS IN THIS GUIDE



WHAT CAN THIS GUIDE DO FOR ME?

The *Guide* does three things:

- it describes how the analysis of benefits and costs fits into the regulatory process (Chapter 1);
- it provides a framework for choosing regulatory and non-regulatory alternatives to explore (Chapter 2); and
- it describes the type and level of analysis that must be completed before preparing Regulatory Impact Analysis Statements.

What level of training in economics is required?

The material has been written for the non-economist (you won't even find a demand curve). Economic concepts are used now and then, but they are explained whenever they are introduced.

I need to analyze a giant regulation. Is this *Guide* going to help?

The *Guide* is not designed to cover proposals with major implications (chapter 2 defines what we mean by "major"). To analyze large proposals, you will need to use standard texts and/or involve economists. However, taking a look at the *Guide*, and especially the first two chapters, might be a good way to begin the analysis of major proposals.

What are the yellow pages for?

The chapters in the yellow pages analyze particular topics in some detail, but you'll probably use only a few of them. The chapters in the white pages (shown in the central column of the Road Map on the opposite page) contain a number of "Quick Tests". Completing these tests will let you know which of the chapters in the yellow pages will help you.

My regulation is small-time, and I don't want to read the whole *Guide*.

Hopefully, you won't mind reading just the first two chapters. Completing another Quick Test at the end of chapter 2 will help all users figure out how much more they should read. If your regulation really is trivial, you won't need to read further.

1 INTRODUCTION

- Canada's Regulatory Policy
- What is Benefit-Cost Analysis?
- Benefit-Cost Analysis in the Regulatory Approvals Process
 - Screening Alternatives
 - Announcement in the *Federal Regulatory Plan*
 - Evaluating the Benefits and Costs of Alternatives
 - Writing the RIAS
 - Monitoring and Follow-up

Canada's Regulatory Policy

The federal Regulatory Policy states that:

The use of the government's regulatory powers [should result] in the greatest net benefit to Canadians.¹

Note the use of the term "regulatory powers". It is broader than regulation alone. It covers all aspects of regulatory programs including standards, guidelines, administrative policies, program manuals, codes of practice and moral suasion.

Two of the mandatory requirements of the Policy are that departments and agencies must demonstrate that:

- regulation is the best alternative; and

1. For an annotated copy of the Regulatory Policy, contact Regulatory Affairs, Treasury Board Secretariat at (613) 952-3459. The Policy was approved by the Treasury Board, Decision #818020, February 1992, under authority granted by Section 7 of the *Financial Administration Act*.

-
- the regulatory program is structured to maximize the gains to beneficiaries in relation to the costs to Canadians.

Before sponsoring a regulation, departments and agencies must make a convincing case that the regulatory approach is superior to non-regulatory alternatives. In addition, they must show not only that benefits to Canadians outweigh the costs, but also that they have tried to structure the regulatory program so that the difference between benefits and costs is maximized.

The performance of departments and agencies in meeting all of the requirements of the Regulatory Policy is subject to audit. Departments and agencies use the Regulatory Impact Analysis Statement (RIAS) to show that they have met the requirements, although they may need to supply supporting documentation for regulations with large cost impacts. Ministers use the RIAS to help them decide whether to adopt a proposed regulation. The RIAS is published, together with the regulation, in the *Canada Gazette*. It is a public document used to explain how the policy is satisfied.

Demonstrating that a regulation maximizes net benefit can be a difficult task. The standard tool for doing so is benefit-cost analysis which, as its name implies, is used to evaluate and compare benefits and costs. Other standard techniques include risk analysis, socio-economic impact assessment, and cost effectiveness analysis. For the purposes of this guide, all are included under the heading "benefit-cost analysis".

What is Benefit-Cost Analysis?

Benefit-cost analysis is an approach used to assess the gains and losses resulting from a set of alternative actions to help decide whether any of the actions should be undertaken. In carrying out the analysis, four questions must be addressed:

- 1) What events, actions or things will change as the result of the introduction and operation of each proposed action?
- 2) What is the estimated value of the benefits that will come about as a result of each proposed action, and who will obtain them?
- 3) What are the estimated costs of each proposed action, and who will pay them?

2. Since regulation is only one alternative, the more generic terms "proposed action" and "proposal" will often be used in this *Guide* to include all alternatives.

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- 4) Given the estimated benefits and costs, should any of the proposed actions be undertaken and, if so, which one?

While the first three questions may appear to be largely technical in nature, inevitably some judgment will be required. Often, it will not prove possible to quantify all the effects of all proposed actions. Generally speaking, you should apply a broad view of both benefits and costs.

Addressing question 4) will normally require even more judgment. If the department or agency responsible for the analysis decides to go forward with a regulatory proposal, it must make the case in the RIAS that the benefits of the recommended option outweigh (or justify) the costs, and also that the recommended option is the best one. This argument must be based on the analysis presented in the document, and it must be made transparent.

The final decision on whether to approve a regulatory proposal rests with ministers, elected by Canadians to use their judgment in the public interest. As a result, while analysts must use their judgment, they should see it as their primary task to give a clear indication of what is likely to happen should each action be undertaken.

It is important that the methodology used to arrive at a given recommendation be as transparent as possible. The conclusions drawn from the analysis should follow directly from the assumptions and methods employed. Benefit-cost analyses completed in the past have been criticized because they used controversial valuations based on hidden assumptions and methods. Important value judgements should not be hidden behind technical wizardry.

The objective of benefit-cost analysis is **not** "quantification of everything" in order to arrive at a single number that will dictate one solution. Rather, it is to present all relevant information, both qualitative and quantitative, to ministers and the public. Nevertheless, some issues, particularly those that relate to cost, lend themselves more easily to quantitative analysis. The anticipated costs of proposed actions are particularly important to ministers because the resources used to achieve one goal cannot be used elsewhere. This guide will help you decide what to report and how to report it.³

3. This *Guide* is intended to supplement earlier guides. *Benefit-Cost Analysis Guide*, published by Treasury Board Secretariat in 1976, is a general purpose manual. The *Technical Guide to Regulatory Impact Analysis*, by W.T. Stanbury and Alan B. Vertinsky, first published by the Office of Privatization and Regulatory Affairs in 1989 and re-released by Treasury Board in 1994, is useful for examining larger regulations.

To summarize, we offer the following description of the roles of analysts, the sponsoring department and ministers:

- the goal of the analyst is to provide accurate estimates of what would happen if each proposal was implemented, including both regulatory and non-regulatory alternatives;
- the sponsoring department is required to make the case in the RIAS that the proposal recommended to ministers is the best one, and that it is worthwhile (i.e., that the benefits justify the costs). The case must be based on the analysis; and
- ministers decide whether the case is sufficient i.e., whether the recommended proposal will be implemented.

Benefit-Cost Analysis in the Regulatory Approvals Process

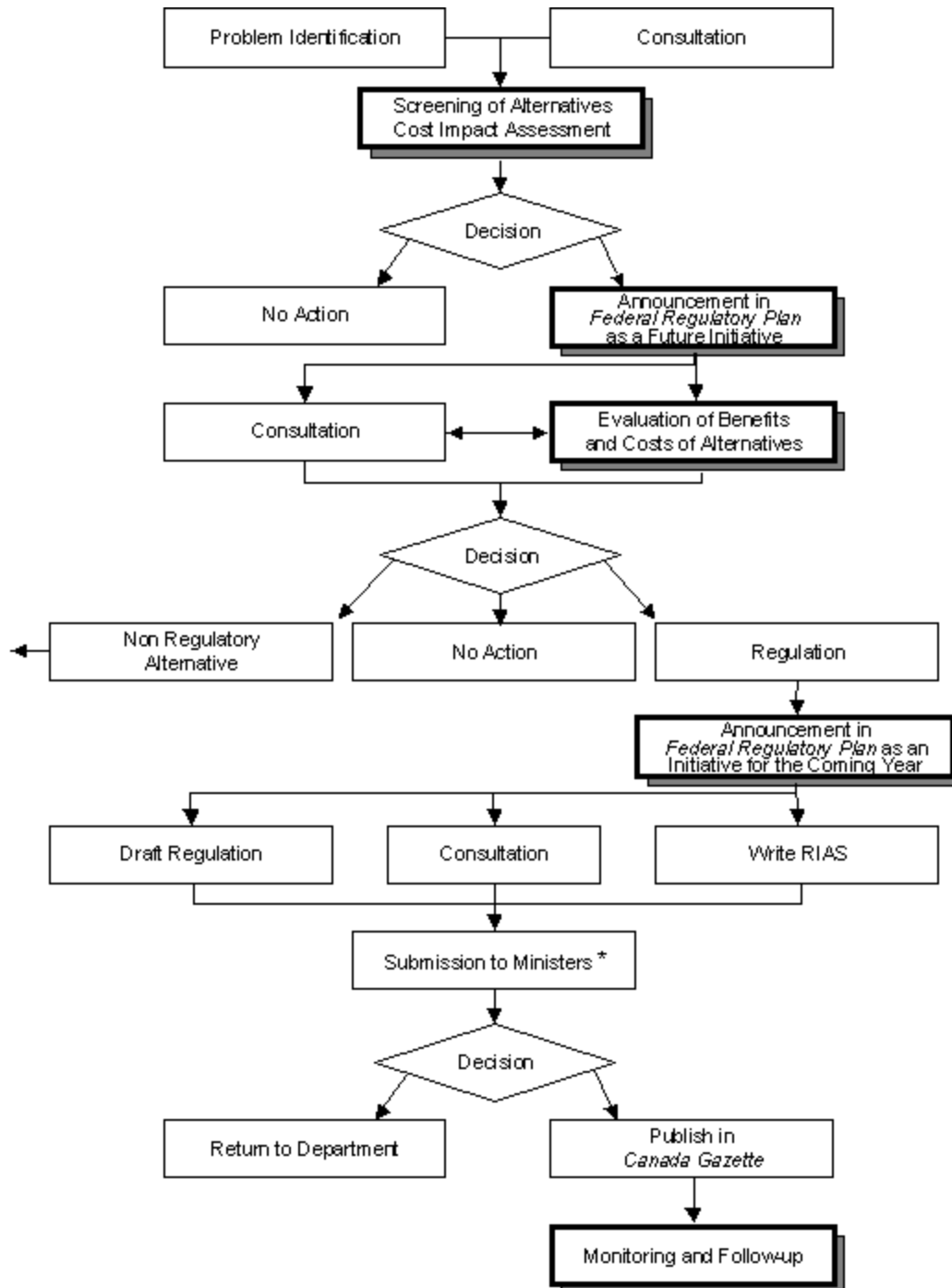
Regulations are distinct from most other government actions because they have the force of law, often with severe penalties for non-compliance. As a result, the process of introducing, changing or eliminating regulations is demanding, involving both legal examination and policy review. The federal regulatory process comes into play whenever regulation is *one of* the alternatives being considered.

A simplified sketch of the regulatory process is shown in figure 1, next page. Notice the three diamond-shaped decision boxes. Before each decision, the necessary information is collected, analyzed, and assembled to enable everyone involved to make an *informed* decision.

The boxes immediately following each decision box include the possible consequences of each choice. The actual processes used in some departments are more elaborate than the one shown, but this diagram includes all of the key steps. Most important, the decision to introduce, eliminate or change a regulation (the last decision box) rests exclusively with ministers, often acting in committee, under authority granted to them by Parliament.

Six boxes are highlighted. The remainder of this chapter considers each of them in turn, and describes how they all fit together in the evaluation of regulatory proposals. The rest of the guide focuses on just two of the highlighted boxes. Chapter 2 describes the screening of alternatives in detail, and chapters 3 through 11 elaborate on the evaluation of the benefits and costs of alternatives.

Figure 1
BENEFIT/COST ANALYSIS AND THE REGULATORY PROCESS



* This diagram oversimplifies the submissions process. In particular, it ignores prepublication and the possibility of subsequent changes to proposed regulations. For a detailed description of the regulatory process, see *The Federal Regulatory Process: A Procedures Manual for the Departments and Agencies*, available from Regulatory Affairs, Treasury Board Secretariat at (613) 952-3499.

A separate volume, *The RIAS Writer's Guide*, addresses how regulatory proposals should be explained to ministers and the public.⁴

Screening Alternatives

The first thing to do in response to a perceived problem is to identify government actions that might address it. "No action" and promising non-regulatory alternatives should always be considered as options. A guide has been prepared to help identify alternatives to regulation.⁵

The alternatives you identify should be subjected to an initial screening or impact assessment. Your initial assessment should be guided by the following objectives:

- to establish which alternatives, including "doing nothing", are feasible;
- to classify the most costly feasible alternative for the purposes of the *Federal Regulatory Plan*;
- to determine whether the Business Impact Test⁶ should be used as a consultation and information-gathering tool; and
- to estimate the time and resources needed to perform an adequate amount of analysis.

A number of departments have formal processes in place to carry out the initial screening. For example, Agriculture and Agri-Food Canada has a "front-end assessment", while Fisheries and Oceans has a process for obtaining approval in principle. Typically, a committee chaired by a senior official is charged with deciding whether or not to proceed, although this decision may be reserved for the minister, or involve third parties. Some initial "informal" assessment of the alternatives makes sense, since the detailed assessment of all alternatives can itself prove very costly.

Departments are responsible for ensuring that the approach they use to carry out the initial screening is compatible with the Regulatory Policy.

4. *The RIAS Writer's Guide*, 1992, an earlier volume in the Regulatory Affairs Series. It can be obtained from Consulting and Audit Canada at (613) 943-8214.

5. *Assessing Regulatory Alternatives*. It can be obtained from the Regulatory Affairs Division, Treasury Board of Canada Secretariat, at (613) 952-3459.

6. The Treasury Board Secretariat, Industry Canada and the Canadian Manufacturers' Association jointly developed the Business Impact Test as a way to assess the impact of proposed and existing regulations and alternatives to regulation on Canadian firms. It is described in more detail in chapters 2 and 6.

Announcement in the *Federal Regulatory Plan*

As part of their consultations, departments and agencies should provide advance notice to other departments, central agencies, and the public on problems under examination that may lead to the development of a regulatory proposal. One way of accomplishing this task is to include the project in the list of future initiatives submitted for publication in the annual *Federal Regulatory Plan*. The information submitted for inclusion in the Plan includes:

- the problem;
- alternatives being considered (both regulatory and non-regulatory); and
- the consultation strategy.

In addition, each initiative must be classified as either "major", "intermediate-cost", or "low-cost". Chapter 2 includes advice on how to classify initiatives.⁷

As noted, giving early notice in the Plan under the heading "future initiatives" is encouraged — it is not required. At a later stage, however, departments and agencies must list the initiative in the Plan under the heading "initiatives for the coming year", should they conclude that a regulation is needed. The classification scheme for notices for the coming year is the same as for future initiatives.

Publication as an initiative for the coming year in the plan is included in figure 1 just before the box labelled "write RIAS". This positioning is somewhat arbitrary, since departments and agencies will decide when to submit the initiative after considering a variety of factors, including its relative importance and the anticipated time needed to complete other steps.

The exact requirements of the *Federal Regulatory Plan* can vary slightly from year to year. For the latest guidelines, consult your regulatory coordinator or call Regulatory Affairs, Treasury Board Secretariat.

Evaluating the Benefits and Costs of Alternatives

As noted, the primary task for analysts is to determine what would happen if each of the alternative actions were implemented and to compare these results with what would

7. Many people think most regulations have high costs. In fact, a study by Consulting and Audit Canada found that fewer than 10 per cent of the regulatory proposals approved by Cabinet have major impacts (more than \$50 million). At the other end of the cost scale, about 30 per cent are administrative in nature with almost no economic impact. This leaves about 60 per cent with small to medium impacts.

happen if the government did not act. The department or agency must select the action (be it regulatory or non-regulatory) that maximizes benefits in relation to costs, and must make the case that all of the benefits associated with the preferred action justify all of the costs.

The remainder of this guide focuses on the detailed evaluation of proposals with small and intermediate cost impacts. The evaluation of proposals with large impacts will require the use of more detailed sources.

Writing the RIAS

Not all results will find a place in the RIAS. The "Benefits and Costs" section should seldom be more than about three double-spaced typed pages.

Any background studies used to write the RIAS should be readily available from the contact person named in the document. For more information on how to present your material in the RIAS, consult the *RIAS Writer's Guide*.

Monitoring and Follow-up

If ministers approve the proposed action, the issue then becomes whether things will turn out as expected. For actions with major or intermediate cost impacts, answering this question may take some work. In the event that all benefits are not realized, or that costs turn out to be greater than anticipated, adjustments may be called for.

Before submitting a proposed action for approval, you should consider how to monitor its effectiveness after it is in place, and how to collect and evaluate the necessary information. To establish the criteria to be applied in future reviews, consider what information *would have been valuable* in preparing the analysis had it been available.

2 SCREENING REGULATORY AND NON-REGULATORY ALTERNATIVES

- Identifying Good Alternatives
- Consultation
- Screening Alternatives

Identifying Good Alternatives

The initial screening of alternative courses of action is perhaps the most critical phase because it structures all the analysis which follows. As described in chapter 1, there are four objectives:

- 1) To establish which alternatives, including "doing nothing", are feasible;
- 2) To classify the most costly feasible alternative for the purposes of the *Federal Regulatory Plan*;
- 3) To determine whether the Business Impact Test should be used as a consultation and information-gathering tool; and
- 4) To estimate the time and resources needed to perform an adequate amount of analysis.

Other guides are available to help you identify promising alternatives and situations where they are likely to prove effective.¹ In this chapter we provide an overview of some of the more important issues.

1. See *Assessing Regulatory Alternatives*. For a discussion of some real-life examples, see *Enlightened Practices in Regulatory Programs* (Volumes 1 and 2). All of these guides are available from the Affairs Division of Treasury Board Secretariat.

Before getting to alternatives, you should first "scope the problem" by addressing three questions:

- 1) What is the problem?
- 2) Is government intervention justified?
- 3) What are the government's objectives?

1) What is the problem?

Try asking the following questions:

- what is happening or not happening that creates the problem?
- what events or behaviours contribute to it?
- who will have to do what differently if the problem is to be solved? Is it a small, clearly identifiable group or a large, undefined one?
- what is motivating those people or groups that are contributing to the problem? Are they doing (or not doing) something out of ignorance, or because it is in their interests?
- what are the key characteristics of the environment that are contributing to the problem?
- how does the public perceive the problem?

Thinking about the last question will sometimes prove especially helpful. If the public doesn't see the problem the same way as government does, they may be reluctant to help solve it. Solutions imposed by government may not be effective if they don't fit in with the way people view the problem.

2) Is government intervention justified?

Individuals, organizations and markets can sometimes deal with problems without government participation. Everything else being equal, solutions developed without formal bureaucratic restrictions are preferable. Ask yourself whether government action is both needed and appropriate.

3) What are the government's objectives?

The government's objective may appear obvious — to make the problem go away. Rarely, however, will it prove possible to accomplish this completely, so asking some additional questions should help:

-
- can the problem be eliminated?
 - how significant is it in the greater scheme of things? Is it a minor irritant or a sizeable danger? How does it compare to other priorities?
 - does everyone (consumers, industry, scientific experts, etc.) agree that there is a problem?
 - can you make a distinction between critical and less important though desirable objectives?

Usually alternative approaches will achieve different goals at different costs. You may find that solving part of the problem will make the most sense, when taking into account both benefits and costs. Should motor vehicle emissions of a particular substance be reduced by half, by three-quarters, or entirely? It depends, of course, on the estimated costs and benefits. What is clear is that any problem should be addressed only for as long as the benefits of addressing it outweigh the costs.

Your task at this point is to construct a list of promising and technically feasible ways of addressing the problem you have identified. Some of these might address only part of the problem, while others might solve it completely. If you are looking for additional guidance on identifying promising alternatives, consult *Assessing Regulatory Alternatives*.

The objective at this point is **not** to choose the best alternative. Rather, it is to come up with a list of alternatives that are worth looking at in more detail. What to do with this list is covered later in the chapter.

Consultation

You may have noticed that figure 1 (page 7) includes three boxes called "consultation". You may also have noticed that consultation is depicted as taking place in parallel with other steps. Why is so much emphasis placed on consulting interested Canadians, and why should it be integrated with almost everything else you need to do? Here are a few reasons:

- consulting can help identify better and/or less costly ways to pursue the government's objectives. Provided the underlying problem is addressed, departments and agencies should be open to alternatives put forward by groups that would be affected;
- usually interested groups have a lot of information that you can use to improve the accuracy of your cost and benefit estimates;
- learning more about the underlying problem and why it exists should help in designing an effective and efficient approach to compliance and enforcement; and

-
- consensus cannot be obtained without a lot of communication. While government cannot (and sometimes should not) satisfy everyone all of the time, obtaining consensus will probably increase compliance. It also sends the right message to Canadians.

You should try to consult as widely as possible. It is especially important that a range of interests (and hopefully all of them) be reflected at the table. The Charter of Rights and Freedoms requires the government to treat people fairly, and this requirement includes giving all interested groups and individuals the chance to express their views. Asking the following questions may help you identify whom to consult:

- at whom is the proposed action aimed? In other words, who would have to change their behaviour? All such groups should be consulted;
- who would be adversely affected indirectly? This category might include companies in related industries, consumers or anyone else who would end up paying part of the bill; and
- who would benefit?

If addressing the problem would have a significant impact on firms, you should consider using the Business Impact Test as part of your consultations. You can use it to help identify alternatives, to collect information for your analysis or to review existing programs. The test is described in detail in chapter 6.²

Describing consultation as taking place at three distinct points in the regulatory process is a bit arbitrary. In fact, consultation can help at other stages as well. For example, it may help identify and screen alternatives.

Screening Alternatives

The reason for including a separate screening step is that analysis is costly. There is little sense in undertaking detailed technical analysis of alternatives which a little common sense would show to be clearly inferior, or where impacts are likely to be very small. The end of this section explains how the information you collect during the screening will help you decide which parts of this guide you should use, and how detailed your analysis should be.

2. We tried to write the Guide so that you wouldn't have to spend much time turning pages, but we couldn't avoid that here. If it seems like you should use the Business Impact Test, look at the relevant part of Chapter 6 now.

You should not seek great precision at this time. Eliminate an alternative from further analysis if it is clearly infeasible, if the preliminary cost estimates significantly exceed prospective benefits, or if it is clearly inferior to other alternatives.

If some alternatives have obvious large net benefits, it may be unnecessary to continue looking at the other options. Try comparing alternatives with similar levels of estimated benefits. Do they differ in terms of costs? The same sort of thing can be done by comparing the benefits of options with similar costs.

You may find it helpful to ask yourself this question: **does it look like "doing nothing" might be the best alternative?** If it appears that more elaborate analysis will lead to the conclusion that the government cannot deal with the problem in a cost-effective way, it might be best to quit now. Remember that the costs of developing and evaluating proposals must be included as one of the costs of addressing the problem. Remember also that bigger isn't necessarily better: for little problems, and maybe even for some big ones, look for simple, low-cost solutions.

The question of how acceptable each alternative will appear to interested Canadians should also be addressed. Some technically feasible alternatives may be viewed as too restrictive or as unfair. While it may make sense to consider whether such views can be influenced, there isn't much point in taking a long look at approaches that Canadians find unacceptable. At the same time, you shouldn't reject novel solutions if they seem promising.

When considering costs, keep in mind that the "base case" should be what would happen if no action were taken. Usually, this situation will be the same as the current situation, although for some issues things might get worse (or even better, on occasion) if nothing was done.

During the screening stage, don't worry too much about the more subtle and indirect effects, unless they are likely to be especially important. On the cost side, get a rough sense of who is going to have to pay how much, how often.

Identifying benefits will often prove more difficult than identifying costs, especially in the health and safety area. Don't try to be too precise, but give some thought to identifying indicators or measures of desired outcomes. Think about injuries avoided and deaths averted, not about "promoting the health of Canadians". At some point, reasonable estimates must replace hazily defined objectives. Identify who is likely to benefit, and in what way they will benefit.

When considering benefits, think about the likely rate of compliance. Obviously, no benefits will be obtained if there is a zero rate of compliance. That is the extreme case.

Generally speaking, however, 100 percent compliance is unlikely. Don't forget to consider explicitly the relationship between enforcement costs, compliance levels and anticipated benefits. At this stage, or possibly later, you should give some thought to how enforcement can be efficient and effective in guaranteeing a high rate of compliance. Another guide addresses enforcement issues in detail.³

Economic "efficiency gains" are established roughly by subtracting all losses from all gains. It is important to emphasize that demonstrating a gain in economic efficiency (i.e., that total benefits exceed total costs) is not the same thing as demonstrating that the alternative should be implemented, because the winners rarely compensate the losers. The fairness of measures that include significant transfers of wealth between individuals, groups, regions or firms should be examined explicitly. This issue might best be examined later, but it is important to keep it in mind. For the purposes of the screening, you should consider all the more important costs and benefits, including transfers.

Using the information you have collected on benefits, costs, effectiveness and acceptability, you should be able to eliminate a number of your alternatives from further consideration. The process used to make decisions is a matter for the responsible department or agency to decide. In some cases, ministerial approval is required, while in others consensus is sought with outside parties.

To classify the initiative for the purposes of the *Federal Regulatory Plan*, and to decide how (if at all) you should use the remainder of this guide, you should focus on the estimated costs of the most expensive remaining alternative, as well as the likely degree of public acceptance. There are two reasons for emphasizing costs over benefits. First of all, at this stage, your cost estimates are probably more accurate than your benefit estimates; it is usually easier to sort out how much money will be paid out than it is to determine what will be obtained in exchange. Secondly, while everyone likes benefits, imposing new costs is more controversial. As the estimated costs increase, everyone will want to know more about all of the anticipated impacts.

3. *A Strategic Approach to Developing Compliance Policies*, Regulatory Affairs Series, Number 2, 1992. It can be obtained from Consulting and Audit Canada at (613) 943-8214.

Quick Test on Estimated Impacts

- ☞ Classify the initiative as low-cost, intermediate-cost or major, using the three step scheme described in the annex to this chapter.

The information provided in the guide will probably prove insufficient to prepare an adequate analysis of the benefits and costs of **major** initiatives. Consult in-house expertise or external consultants. However, you may find at least parts of the remainder of the guide helpful as you define, manage or interpret more detailed analysis.⁴

At the other extreme, for **low-cost** initiatives, you probably won't need to collect any more information, especially if the proposal is not controversial. If you decide to go the regulatory route, the screening should have provided you with enough information to prepare the benefits and costs section of the RIAS.

If you are somewhere in between, that is, if you have classified the initiative as **intermediate-cost**, you should find at least parts of the rest of this guide helpful. Chapters 3 and 4 introduce the basics of analyzing benefits and costs respectively. These two chapters also contain a number of additional Quick Tests. Completing these will direct you to those chapters in the yellow pages that are relevant to your analysis, and away from those that are not.

4. You may also find helpful a more detailed guide called the *Technical Guide to Regulatory Impact Analysis*. It is available from Regulatory Affairs, Treasury Board Secretariat.

A Checklist

- Have you defined the problem?
- Have you defined the government's objectives?
- Have you identified the groups to be consulted?
- Have you decided whether the Business Impact Test should be used as a consultation and information-gathering tool?
- Have you established the consultation process?
- Have you categorized the initiative as major, intermediate-cost, or low-cost?
- Do you have an idea of how long it will take to do a good evaluation of the benefits and costs?

ANNEX

A THREE STEP APPROACH TO CLASSIFYING INITIATIVES

Step 1

Determine whether the present value of your cost estimate for the most expensive alternative is less than \$100,000, between \$100,000 and \$50 million, or greater than \$50 million.

Normally, the "present value" is calculated by applying a discount rate to the cost estimates for each year. Discounting is discussed in detail in chapter 11. To simplify things, you may find it easier to sum up the cost estimates for the first 11 years without discounting. While a bit arbitrary, this approach will suffice for most initiatives.

Step 2

Determine whether the initiative has a high or low degree of acceptance.

Initiatives have a low degree of acceptance if either:

- there are significant policy concerns such as international trade, sustainable development, or fairness issues; or
- there are public acceptability questions due to particular social, regional, or sectoral sensitivities.

Step 3

Combine the results of steps 1 and 2 to classify the initiative (see also table 1):

- if the initiative has a present value of costs less than \$100,000, it should be classified as **low-cost**, regardless of whether the degree of acceptance is high or low;
- if it has a present value of costs between \$100,000 and \$50 million and a high degree of acceptance, it should be classified as **intermediate-cost**; and
- if it has a present value of costs between \$100,000 and \$50 million and a low degree of acceptance, or a present value of costs greater than \$50 million, it should be classified as **major**.

Table 1
Classification Scheme

ANTICIPATED COST	DEGREE OF ACCEPTANCE	
	HIGH	LOW
< \$100,000	low-cost initiative	low-cost initiative
\$100,000 to \$50 million	intermediate-cost initiative	major initiative
> \$50 million	major initiative	major initiative

An Example

Contemplated changes to sport fishing regulations would shorten the season and reduce the allowable catch in order to preserve fish stocks.

Step 1 (cost estimate): Suppose that the change would result in each fisher taking one less fish each year. The market value of a fish is about \$5, and 400,000 licences are sold each year. Ignoring any additional satisfaction obtained from the fishing experience, a quick estimate of the cost of the change would be 400,000 times \$5 = \$2 million per year. The estimated cost over 11 years would be \$22 million.

Step 2 (acceptance): Acceptance is probably quite high, since fishers are aware that fish stocks are declining.

Step 3 (categorize): The initiative should be classified as intermediate-cost.

3 BENEFITS

- Overview
- Identifying benefits
- Determining who would benefit
- Deciding how to measure each benefit
- Establishing the baseline
- Estimating what would happen
- Translating to common units (if you can)
- Summarizing your results

Overview

The benefits of a proposed action are the good things that would result from implementing it. Often they can be described in terms of the reduction or removal of a problem.

Good things sometimes result indirectly. Proposals can have intended or unintended side effects, which may be beneficial or costly.

The amount and kind of benefits associated with each alternative you are examining may be different, and each alternative may result in multiple benefits. When identifying benefits, take a broad view by identifying all of the most important direct and indirect ones for each alternative.

Two problems can arise when you are trying to quantify benefits. First of all, you may find it difficult to find any numbers at all. You may not know, for example, the number of waste haulers of a given type, or the number of people with a given health condition that might need a new medication. The solution to this problem is to look around and make the best use of those numbers that are available. If you can't get direct

measures, look for reasonable substitutes (or proxies, as discussed later in the chapter).

The second problem arises when you need to make difficult value judgments when evaluating benefits. What is the value of establishing electoral institutions for local government in aboriginal communities, or the value of saving lives by reducing risks to Canadians? If you are hoping that this guide will provide definitive answers to these kinds of questions, you will be disappointed. What it does offer are two messages.

First of all, numbers will help you make decisions, so try to get them. Maybe you can't put a dollar value on preserving a park, but you can say how large the park is, how many visitors it gets, and what it means to the local economy.

Secondly, while you shouldn't try to impose numbers on benefits where it doesn't make sense to do so, techniques exist that may help you value at least some benefits that are difficult to quantify. This problem is discussed in more detail later in this chapter, and a number of the techniques are outlined in chapter 9. Indeed, you may find that valuing a park isn't quite as difficult as it might first appear.

Numerical estimates, even if imperfect, will help you, decision makers and the public to assess the merits of proposed actions.

The rest of this chapter is based on the seven-step process for examining benefits outlined in the box on page 23. You should apply all seven steps to each alternative.

Quantifying benefits may appear to be an impossible task, but it is made a good deal easier by looking at it as a series of steps. If you identify and deal with any problems that arise at each step, you will usually be able to create credible estimates of program benefits.

After you have estimated the benefits, you can turn your attention to costs. After that, you can decide whether it is necessary to discount your estimates so that you can line up benefits against costs. With that information, you can make your recommendation regarding which, if any, of the alternatives should be implemented. But we are getting ahead of ourselves. Those issues are covered in chapters 4 and 5.

Identifying benefits (Step 1)

Identify the good things that would result from implementing each alternative - that is, those things that, if added or removed, would improve the situation. Here are some examples:

-
- fewer workplace injuries;
 - less red tape;
 - fewer poisonings;
 - less illegal immigration;
 - better product information for consumers;
 - lower risks for property owners;
 - lower costs for taxpayers; and
 - healthier air in restaurants and public places.

Estimating benefits

- *Step One -- Identify benefits:* list potential benefits - that is, anticipated consequences that would make somebody (anybody) better off.
- *Step Two -- Determine who would benefit.* Be sure to ask a selection of those you identify to see whether they agree.
- *Step Three -- Decide how to measure each benefit:* choose indicators to estimate benefits over time.
- *Step Four -- Establish the baseline:* estimate how much each indicator would change in the future if nothing was done.
- *Step Five -- Estimate what would happen:* estimate how each indicator would change over time if the proposal was implemented.
- *Step Six -- Translate to common units if you can:* consider whether some or all of your indicators can be translated into common units. Translate those that can be.
- *Step Seven -- Summarize your results:* what will be obtained by whom, when, relative to the baseline?

Ask those who would be affected to help build your list of benefits.

To identify benefits, it may help to think in terms of established government policy and program objectives.

Remember that the goal of most regulatory programs is to cause change. Something should happen in the future that isn't happening now, or something shouldn't happen that is happening. Your task is to find a way to measure these changes.

Determining who would benefit (Step 2)

Try to specify the groups, organizations and individuals who will receive each of the benefits you identified in step 1. Here are some examples:

- the users of a specific service;
- the producers of a particular product;
- children in a specific age group;
- people in a particular region; and
- the federal government.

By reviewing data from a variety of sources, you should be able to estimate the number of people who would receive each of the benefits you identified.

If you can't identify likely beneficiaries, regulatory action might be premature. Perhaps you should spend some more time collecting information before proceeding.

Try to take a broad view of each proposal. Consider whether anyone not directly targeted will benefit indirectly. For example, a health and safety program targeted at workers might also benefit firms by lowering insurance premiums.

Once you have identified possible beneficiaries, be sure to ask a few representatives to see whether they share your view of how you think they would benefit. There are a number of reasons why asking will be useful.

First of all, if they agree with your view, you will be more confident about the accuracy of your list. Asking around may also allow you to identify other beneficiaries, or improve your estimate of the number of beneficiaries.

Secondly, if those you have identified as beneficiaries don't agree, maybe you should reconsider your list. If you can't convince them that they will benefit, then maybe it's not worth going forward with the proposal. For example, it doesn't make much sense to introduce a program designed to help industry if businesses don't want it. Making a theoretical argument to support a role for government does not in itself justify government intervention. Asking those who would be directly affected keeps government from doing things that sound good, but may not make much sense.

Ask potential beneficiaries, and listen to what they have to say.

Some government actions may simply transfer resources from one group to another. Consider the introduction of a user fee for a service that the government previously supplied free of charge. For every dollar the government receives, users must pay a

dollar. When your proposal includes a transfer, don't forget to address the cost side of the equation when you get to costs. Paying unemployment insurance benefits and sending equalization payments to the provinces are other examples of transfers.

Clearly, the direct benefits of transferring resources from one group to another can't exceed the direct costs, since they are by definition equal. Consequently, you will have to look for indirect effects to demonstrate net benefit. Introducing a user fee, for example, may lead to greater efficiency, since the government will get some feedback on how much users like the good or service in question (if they don't value it very highly, they won't pay very much for it). Because of the feedback, it's more likely that the right amount of the good will be provided.

On the other hand, the government may have a duty to provide some things without charging for them. It may be unfair to charge for job counselling for the unemployed, for example. When considering a proposal that would transfer resources from one group to another, you will have to consider secondary effects to decide whether it makes sense.

Take note if your analysis suggests that only a single firm or industry will benefit. In particular, ask yourself whether the proposal would make it more difficult for new firms to enter the industry in question. Firms protected from competition may be tempted to raise their prices. This harms consumers, of course, and it may also lead to an inefficient allocation of resources across industries.

Conversely, removing regulations which protect firms from competition may benefit both consumers and potential competitors. Removing them may also encourage the development of healthier Canadian firms better able to compete for market share in Canada and abroad.

While these kinds of secondary benefits are difficult to identify and quantify with precision, they can be very important. These issues are discussed at length in chapters 6 and 7. For now, keep in mind that competition is usually very beneficial, and that you should look broadly when identifying benefits and beneficiaries.

Benefits to non-Canadians

It is government policy that the evaluation of benefits should focus on benefits to Canadians. However, estimating the benefits to Canadians of proposed government actions may tell only part of the story. Canadians may benefit indirectly from regulations that primarily benefit non-Canadians.

Consider airline navigation, for example. Large numbers of international travellers use Canadian airports, and many foreign planes cross Canadian airspace. If every national government considered only how its nationals benefited from its actions, an inadequate amount of infrastructure and safety would be provided. As a result, international agreements effectively require governments to treat other nationals the same way they treat their own. Benefits to non-Canadians provided by the federal government are offset by benefits to Canadians supplied by foreign governments.

Another example is the protection of the atmosphere. Looked at internationally, Canada produces an apparently insignificant amount of the substances that deplete the ozone layer. It would make very little sense to reduce the use of these substances if other countries didn't do the same thing. Under the terms of the Montreal Protocol and subsequent international agreements, however, all nations will benefit, since all participating governments commit to act in concert. Canadians directly gain very little from the actions of the federal government, but they may gain a lot indirectly.

Negotiating international treaties can be expensive and time consuming. As a result, it may make sense to work informally with other countries to address common problems. We should do something if we are confident that other nations will act as well, assuming that the total benefits to Canadians exceed total costs.¹

So, while focusing on benefits to Canadians is the right thing to do, in some cases a narrow focus is inappropriate. Don't forget to take into account benefits to Canadians provided by other governments that are contingent upon actions taken by the federal government. If there are such indirect effects, make sure that the RIAS provides an overview of the treaty or informal arrangement, describes the actions other governments are taking that will benefit Canadians and estimates the value of the benefits to Canadians.

Deciding how to measure each benefit (Step 3)

It is important to describe the benefits with numbers wherever possible. Rather than hazily defined objectives, your analysis should specify indicators for the benefits you identify, and it should provide estimates for each of them. Numerical estimates will help decision makers judge whether the proposal makes sense. Moreover, indicators should prove helpful when it comes time to review the effectiveness of the program, should the proposal be implemented.

1. For some suggestions on how to cooperate with other governments, see *Regulatory Cooperation between Governments*, available from Regulatory Affairs, Treasury Board Secretariat at (613) 952-3459.

The need for measurable outcomes is becoming more important as the resources available to departments are declining. Program managers must at least be able to demonstrate that allocated funds are doing what they were intended to do. If the program works, you will have the information to show that it does. If it doesn't, you will know that you should make changes or focus on other priorities.

It will almost always be impossible to say exactly what will happen, but it will almost always be possible to give some sense of what will probably happen.

Your task at this stage, then, is to identify what numbers or indicators you will use to represent the benefits you have identified. Don't worry too much whether your units of measurement for benefits will be the same as for costs: focus instead on finding numbers that represent the benefits you identified in step 1.

You may find that the value of an indicator depends on a number of things. Where this is the case, you may need to do some work to generate estimates. Consider government efforts to preserve fish populations. A good indicator of the benefits is the number of fish caught each year. To estimate the value of this indicator, it may prove necessary to collect information on the age, size and location of fish present today in order to predict future growth.

If information is not obtainable about your preferred indicators, you might consider using "proxy" indicators (or proxies) to estimate them indirectly. These are numbers that give an indication about the numbers that you are really interested in, because the two numbers are correlated. For example, it may not be possible to estimate the number of poisonings due to a particular substance, but perhaps you have information about the number of telephone calls to a poisoning hot line about the substance in question. Some callers may be seeking information, while some poisonings may have gone unreported. You might use the number of calls as a proxy for the number of poisonings. The estimate may be imperfect, but using it is undoubtedly better than doing nothing.

In other cases, you may have access to data for only a subset of the universe that you are interested in. Perhaps you have data for a single province, while you might be interested in national figures. You might use the provincial data to estimate the value for the nation as a whole.

Take note of any assumptions you make or proxies you employ. This information may prove important for decision makers.

Before deciding how you will measure each benefit you identified, consider whether the proposed action will clearly affect the size of the indicator, as well as whether the data

exist to measure the indicator in a reasonably accurate way. If these considerations give you cause for concern, your search may not be over.

Establishing the baseline (Step 4)

By now, you should have decided what indicators you will use to measure the benefits you identified in step 1. To estimate the benefits, you will compare the estimated value of the indicators with and without each proposal. In other words, the value of your benefits will equal the value of your indicators with the proposed action less their value without it. For example, suppose you estimate that a new workplace health and safety program would reduce the number of accidents of a specific type from 10,000 to 6,000 each year. Your benefit estimate, then, would be 4,000 accidents avoided per year.

To calculate the benefits in our simple example, it was necessary to estimate the value of the indicator (the number of accidents of a particular type) with and without the program. This brief section deals with estimating the value of your indicators without the program. For each indicator, you need only do this calculation once since the same value can be used for all alternatives (though of course some indicators may be unique to particular alternatives).

Normally, the baseline (i.e., the situation without the action) will be easy to determine. You can usually assume that the future will resemble the present. If the government doesn't act, the value of your indicators in the future will be the same as their value today. However, this may not be true for proposals designed to deal with certain kinds of problems. Consider the fish stocks example again. Perhaps the proposed action is intended to prevent further stock losses. In this case, your baseline would be the decline in the number of fish that would result if the government did not act. As a result, to establish the baseline, you might estimate the current rate of loss and apply it to the future.

In order to isolate the anticipated effect of each proposal, you must estimate the value of your indicators with and without each of them. Step 4 addresses the easier issue -- the situation without the proposed action. The next step addresses the more difficult issue.

Estimating what would happen (Step 5)

The more difficult issue is estimating how your indicators would change if each proposal was implemented. How much change would come about as a result of the proposed action? The task is extremely important as well as difficult. It is not sufficient

justification for the government to act because it has to be seen to be doing something. Ministers and the public will want to know what will be obtained in exchange for taxpayer's money and the dollars of others who will bear the costs.

Before offering some advice on how to estimate how your indicators would change, we address a few outstanding issues.

You may be uncertain how to present your results. For each alternative, you should estimate the value of your indicators for future years, one number for each year. The question that next arises is, of course, how many years?

The time frame you choose should make it possible to line up the benefits against the costs in a way that helps decision makers. The simplest case probably occurs when both the costs and the benefits are the same each year. Here, you need only calculate values for one year. If the benefits justify the costs in one year, they will of course justify them every year.

But not all cases are so simple. Perhaps the costs occur up front, while the benefits won't be obtained until much later. In this case, you will want to consider a longer time frame. You will probably also need to discount your estimates. Discounting is discussed in some detail in chapter 11. For now, we provide a brief overview.

Paying today for benefits to be received much later is, everything else being equal, less desirable than paying the same amount for benefits that will be received immediately. A program with immediate costs and delayed benefits is a kind of investment, and it should be treated that way.

So, if your case is not so simple, you will need to determine when benefits and costs would be realized. In deciding how long your time frame should be, keep in mind your final goal, which is to match up the estimated benefits against the costs so that ministers can decide whether the proposal should be implemented. Note that you should use the same time frame for all alternatives, as this will facilitate comparing them. If you are unsure how to proceed, you may want to consult chapter 11 now or seek some outside advice.

We have already noted that figuring out how your indicators would change can be difficult. Rarely will you be completely confident in the accuracy of your estimates, so at some point you must ask yourself whether you have done enough. How much time should you spend on your analysis? In theory, the answer is easy: you should collect information for as long as the anticipated benefit of collecting it exceeds the cost of collecting it. In practice, this advice isn't likely to prove very helpful, however. Here are four more practical guidelines:

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- spend more time and money on your analysis in proportion to a rough estimate of anticipated total costs;
 - stop spending time and money on particular alternatives if it becomes clear that other alternatives would be superior;
 - spend less time and money on an alternative as it becomes clear that the costs exceed the benefits; and
 - if your analysis indicates that one alternative is clearly superior to the others, spend less time and money on it as it becomes clear that benefits exceed costs. Once it becomes obvious what should be done, there is little point collecting more information.

You will note that the guidelines suggest that you should analyze costs and benefits in parallel. It was judged too difficult to write this guide that way, but the procedure makes sense. Start with a simple overview of both benefits and costs, and then refine your analysis, keeping the four guidelines in mind.

So, how do you figure out what would happen to your indicators if each proposed action was implemented? The answer to this question will probably depend on the particular area you are examining. Generally speaking, your challenge is to identify an underlying model that connects the specifics of each proposal to the indicators you identified in step 3. If you are looking at fish stocks, you will need to know something about the breeding habits of particular species. If you are examining ship safety, you will have to find out about how and why accidents occur. Focus on the key elements of the process that connects your indicators to the things affected by each proposal.

When estimating how things would change under each alternative, keep in mind that benefits result from compliance. Consequently, if there is no compliance, there won't be any benefits either. Be realistic about compliance rates.

Clearly, "getting the model right" can be a very difficult undertaking. Talk to technical experts, try to adapt existing information to the task at hand, and seek outside advice when you are unsure how to proceed.

Remember that your task is to come up with reasonably accurate estimates for your indicators, not to provide numbers to support a particular regulatory approach. Let your analysis lead you to the right recommendation, not the other way around. Be sure to take a broad view, and ask yourself whether you feel comfortable with the assumptions you make as your analysis proceeds.

Example

The *Streamlined Accounting (GST) Regulations* would provide alternative accounting options to make it easier for up to one million small businesses and non-profit organizations to calculate their remittances under the GST.

The Issue: What are the benefits?

Approach: The benefits are primarily administrative savings due to a reduction in paperwork. In addition, beneficiaries might avoid having to purchase the more sophisticated cash registers needed to calculate the GST for each transaction.

Requirements: You will need to estimate how many organizations would participate in order to estimate total savings. Total benefits are potentially huge (in excess of \$1 billion) if participation rates are high. Your model should examine the decision organizations would make whether or not to participate in the program. A trial study using a sample of organizations might be in order, both to calculate an accurate estimate of the benefits, and also to discover how the proposal might be refined to increase participation.

The remainder of this section focuses on a number of issues that may arise as your analysis of what would happen under each proposal proceeds.

You may find that you are unsure about the actual value of one or more of the variables in your model. Perhaps you have a good idea that the current number of fish of a particular species is somewhere between 10,000 and 20,000. One option would be to use the mean value, or 15,000. Another option would be to run your model on a range of values (say 10,000, 15,000 and 20,000). The latter approach is called sensitivity analysis and is discussed in more detail in the box on page 32.

Being a bit unsure about the value of specific variables in your model may cause you a few headaches, but this uncertainty may be the least of your concerns. In some cases, you may have almost no idea about the value of a variable, or you may be unsure about the model you should use.

The common sense thing to do in the face of uncertainty is to collect more information. In some cases, however, it may become clear that the cost of obtaining pertinent information would be prohibitive. If this is the case, don't proceed. It can be hard to abandon analysis before getting to useful results, but sometimes that is the right thing to do. Where this is the case, the decision whether or not to implement the proposal should be based on the imperfect information that has already been collected. Keep in mind the four guidelines presented earlier when considering whether to proceed with more detailed analysis.

Ranges and Sensitivity Analysis

Sensitivity analysis is a fairly simple tool you can use to see how much your indicators depend on the value of particular variables. What you do is repeat your calculations with different values to see whether your estimate is "sensitive" to the value of the uncertain variable.

The number of computations you need to do depends on the number of uncertain variables you have. If you test for three values for each of two variables, you will have nine outcomes (3^2 equals 9). If you have four values for each of three variables, you will have 64 outcomes (4^3 equals 64). Using spreadsheets and other computer tools can make these calculations quite manageable, but you may want to simplify things by eliminating unlikely combinations.

If you do use sensitivity analysis, you should present your estimate in the form of a range. The range should go from the lowest to the highest estimate across all combinations of uncertain variables.

What you really need to discover is whether your recommendation depends on the value of uncertain variables. If you discover that it does, then your report should clearly indicate that this is so. If it doesn't, you have much less cause for concern.

In the event that your recommendation is sensitive to the value of a particular variable, you should consider whether it makes sense to try and get more accurate estimates to reduce uncertainty.

If you need to discount your estimates, you should carry out sensitivity analysis based on the discount rate (see chapters 5 and 11).

For health and safety programs, benefits may come in the form of reduced risks for Canadians. The term "risk" refers to situations where adverse consequences occur with some probability. As you step in your car each morning, you don't know whether you'll have an accident that day, but you do know that there is some chance that you'll have an accident. A situation is said to be "risky" if the probability is known, while it is defined as "uncertain" if it is not known. Thinking in terms of risk can prove a very effective way to analyze problems as diverse as bank failures, transportation accidents,

ozone depletion, the contamination of water supplies and the spread of disease among farm animals.

Example

An amendment to the *Motor Vehicle Safety Regulations* would require the installation of three-point rear seat belts and automatic restraint systems in all existing motor vehicles.

The Issue: How can the benefits be estimated?

Approach: The benefits would come in the form of fewer injuries and lives lost, along with reduced medical costs. You should employ a risk framework.

Data Requirements: You will need to estimate the number of cars without three-point rear seat belts, the number of people who would use these seat belts if they were installed, and the number of rear seat passengers injured or killed each year.

Chapter 8 in Part II of the guide examines both uncertainty and risk in some detail. As noted in chapter 2, this chapter and the next two chapters contain a number of Quick Tests to help you decide whether to consult any of the chapters in Part II.

If you answer yes to either of the following questions, you should consult chapter 8:

Quick Test on Risk and Uncertainty

- Is the proposed action intended to reduce risks to Canadians?
- Is there substantial uncertainty about the frequency of the problem that the proposed action would address?

Step 6: Translating to common units (if you can)

Ideally, all costs and benefits should be expressed in the same units, because that will make it much easier to decide whether any of the alternatives should be implemented. If total benefits exceed total costs then the proposal is good. Otherwise it is bad although, as noted elsewhere, who wins and who loses may also prove important. It is easier to compare costs and benefits, and to compare alternatives, if they are expressed in the same units.

Usually the units chosen for comparing benefits and costs are dollars, but there is no reason why you have to use money. For health and safety programs, for example, it may prove more fruitful to convert costs in dollars to lives saved. This approach has been called "health-health" analysis. But using dollars as a common measure of value (which, after all, is exactly what money is) can be very useful.

Market and Non-Market Activities

A basic distinction can be made between goods and services that are traded in the market and those that are not. Market goods and services offer the distinct advantage of having an established value, determined by the actions of buyers and sellers. It is not necessary to debate how much a pound of coffee is worth: you need only go down to the local market and find out. To value market goods and services, you should generally use market prices.²

Dealing with goods or services for which no markets exist can be more complicated: you can't go to a store and find out how much improving the environment or the fairness of the tax system is worth. Consider the following example:

Example

The *Oil Pollution Prevention Regulations* prescribe a maximum tolerance for oil discharge and set standards for pollution prevention equipment to be used aboard ships operating in certain Canadian waters and fishing zones. By enacting these regulations, Canada is meeting requirements under the International Convention for the Prevention of Pollution from Ships (MARPOL).

The Issue: How can the benefits of the regulations be quantified?

Approach: Identify, quantify and evaluate both the environmental damage resulting from operational and accidental discharges, and the positive influence of the regulations.

Data Requirements: It shouldn't prove too difficult to estimate the influence of operational discharges on marine pollution. Estimating the economic and social value of reducing damage to the marine environment and the public's willingness to pay for cleaner waterways will prove more difficult.

2. In some cases market prices may not reflect all the benefits received or costs paid by society (i.e., there may exist positive or negative "externalities"). This issue may have to be addressed in the analysis of major regulations, but it is beyond the scope of this guide.

One way of dealing with non-market goods or services is to find proxies based on market goods. For example, you can get an idea of how much a hiker values a trek through the woods by estimating how much time and money it costs to get to the trail. The experience must be worth at least as much as the amount of time and money spent to get there. Using the prices of market-goods is only one approach that has been developed to get at difficult to quantify benefits.

If you worked through steps 1 to 5, you should have collected a bunch of numbers corresponding to different alternatives, indicators and years. You may also have in mind a number of additional benefits for which you were unable to identify indicators. Given the usefulness of common units, you may want to consider whether some or all of your estimates can be converted to dollars or some other common unit. You may also want to try again to assign numbers to benefits that you found difficult to quantify. You should find help with both issues in chapter 9, which covers environmental and other non-market activities.

If you answer yes to either of the following questions, you should consult chapter 9:

Quick Test on Non-Market Activities

- ☞ Do some of the benefits relate to protecting the environment?
- ☞ Do some of the benefits have values for which there is no market or price, like fairness or justice?

Summarizing your results (Step 7)

By now, you should have worked your way through the first six steps:

- step 1 resulted in a list of benefits for each alternative;
- step 2 identified who would obtain each of the benefits listed in step 1;
- in step 3, you associated indicators with most, and preferably all, of the benefits you identified;
- in step 4, you estimated the value of each indicator assuming that nothing was done;

-
- for each alternative, you estimated in step 5 the value of all indicators assuming that the alternative was implemented. You generated estimates for each year of a time frame chosen so that benefits could be lined up against costs. Some of your estimates may be in the form of a range of values; and
 - in step 6, you changed the units of some of your indicators. You may also have identified and then estimated the value of a few additional indicators.

Now, you should calculate the value of all quantified benefits for each alternative by subtracting the value of the indicator under the baseline from its value assuming that the alternative was implemented. For each alternative, you should follow this procedure for each year of the time frame chosen in step 5.

Now you can summarize your results for each alternative. For each year of the interval, state who will obtain what.

You may also have some "leftover" (unquantified) benefits for one or more alternatives. Make a note of these.

You may have concerns about the accuracy of some of your estimates. You should have addressed this problem in part by carrying out sensitivity analysis and including ranges for some of your estimates. Be sure when you write up your analysis to highlight areas of uncertainty.

A Checklist

For each alternative, have you:

- identified all of the most important direct and indirect benefits?
- identified who will obtain each benefit?
- chosen indicators for each benefit, where possible?
- chosen an appropriate time period?
- estimated the value of each indicator assuming that nothing was done?
- estimated the value of each indicator assuming that the proposal was implemented?
- considered whether any of your estimates can be translated into common units?
- calculated the value of the benefits as the difference in the value of the indicator with and without the proposal?
- dealt adequately with areas of uncertainty?
- summarized who will obtain what for each year of the time frame?
- included in your summary a description of any benefits that could not be quantified?



4 COSTS

- Costs According to Accountants and Economists
- Costs to Business
- Costs to Consumers
- Costs to Government and Cost Recovery

Costs According to Accountants and Economists

Most simply, the cost of something is what you have to give up to get it. Normally we think about prices when we think about costs: a particular book costs \$20, a round of golf costs \$30, etc.

An accountant thinks in terms of prices too, but an economist has something a bit different in mind. Both professions use the same definition (what you have to give up), but they apply it in different ways. To demonstrate the difference, we'll consider the cost of a regulation that would require factories to reduce pollution.

The accountant wants to know what would have to be done to the factories to meet the new requirement. Factory by factory, he or she would identify the necessary changes and then estimate their dollar cost. Adding these costs across all factories would provide the accountant with the cost of the regulation.

The economist wonders a bit more about what has to be given up. Perhaps profit margins are so low at some factories that they will decide to stop producing rather than comply with the regulation. These decisions may have repercussions for suppliers, to say nothing of the employees and owners of those factories that would close. What will suppliers, workers and owners have to give up? And what about the money spent by factories that would choose to comply? Would some of those costs get passed on to customers or suppliers? Would wages or profits be affected? Things can get pretty complicated once you start thinking broadly about "what would have to be given up."

The accountant usually has an easier time calculating costs than the economist does. For minor proposals, you can probably think like an accountant. For bigger ones, you should probably think more broadly, like an economist does: how will organizations and individuals likely react should the proposal be implemented?

Costs, at least in the "accounting sense," are usually much easier to identify and evaluate than benefits. For example, the cost of pollution control equipment is generally much easier to figure out than the value of having a cleaner environment. The cost of introducing safety measures at a factory is easier to measure than the anticipated decrease in injuries.

As with benefits, the key to evaluating costs is figuring out how everyone who would be affected would react if the proposal were implemented. Will new equipment be needed? Will procedures have to be changed? Will it take longer to do anything? To do this, you will need to learn about those the regulation would affect: what do they do now, and how would they react?

Your task is to identify the costs associated with each alternative and then estimate their value for each year of a time period. To make it easier to compare costs to benefits, and alternatives to one another, use the same time period for costs that you chose for benefits in chapter 3.

To obtain the information you need, you might adapt the process outlined for benefits in chapter 3. If you want to do that, carry out each of the following steps for each alternative:

Estimating costs

- *Step One* -- Identify costs (anticipated consequences that would make somebody (anybody) worse off).
- *Step Two* -- Determine who would pay each cost.
- *Step Three* -- Decide how to measure each cost: choose indicators to estimate costs over time.
- *Step Four* -- Assuming nothing was done, estimate the value of each indicator over time.
- *Step Five* -- Assuming the alternative was implemented, estimate the value of each indicator over time.
- *Step Six* -- Translate some or all of your indicators to common units. Since costs can usually be expressed in dollars, you may be able to skip this step. However, you might also consider whether some of your cost and benefit estimates can be translated to common units.
- *Step Seven* -- Summarize your results: who would give up what, when, relative to the baseline.

The rest of this chapter includes sections on costs to business, to consumers, and to government. Each section offers suggestions on how to identify what will change and how to quantify these changes. By working through the chapter, you'll be able to identify and estimate all of the more important costs.

One thing to keep in mind as you examine costs is to avoid double counting. Suppose, for example, that a regulation would increase production costs for a particular product. Some of these costs will come out of existing profit margins, some might come from the wages of workers and some will be passed on to consumers. For minor proposals, you might simply estimate the increase in production costs. For bigger proposals, you might want to divide the bill between owners, workers, consumers, and possibly suppliers as well. Whatever you do, be sure to avoid counting the same dollars twice.

Costs to Business

The way governments choose to regulate can affect, both directly and indirectly, the ability of businesses to survive, plan and grow.

Some regulations benefit business. It's hard to imagine how financial markets could operate, for example, without rules backed by government. Moreover, regulatory programs that impose costs on businesses may make sense, if they are effective at promoting social objectives, such as health, safety, or the quality of the environment. Where possible, however, these objectives should be pursued in ways that limit the negative impact on business. It's businesses, after all, that create wealth and employ the majority of Canadian workers.

Bearing this in mind, we should take notice if proposals would prevent firms from doing the things they need to do to keep producing. We should be especially concerned if new requirements would interfere with the efficiency of production. For example, to the extent possible, firms operating in Canada should be free to seek productivity improvements.

Secondly, we should wonder about proposals that would make it difficult for firms operating in Canada to introduce new products wanted by their customers, or to improve existing products. Firms won't be able to keep producing if they can't supply the goods and services that will be in demand in the future.

Thirdly, government interventions that increase the relative cost of producing things in Canada may be a concern. We should take note if a proposal wouldn't treat goods produced in Canada the same as competing goods produced abroad. The same thing should apply to competing services. This is especially important if the firms that would be affected are experiencing difficulties.

The Business Impact Test, described in chapter 6, may help you obtain information about costs directly from businesses that might be affected.

Example

The *Dangerous Chemicals and Noxious Liquid Substances Regulations* apply a total ban on all operational discharges of noxious liquid substances from ships and terminals in Canadian waters and fishing zones (excluding the Arctic, which is covered under another regulation).

The Issue: What are the costs to business of the regulations?

Approach: Find out how shipowners comply with the requirement. What equipment is needed? Do trips take longer? Must forms be completed?

Data Requirements: The number of ships that would produce discharges without the regulations, and the costs they bear to ensure they don't, including both capital and operating costs.

Example

Changes to the *Income Tax Regulations* would raise an additional \$330 million in tax revenue over five years from the minerals and oil and gas sectors.

The Issue: What are the costs of this measure?

Approach: The \$330 million is a transfer between the affected firms and the government. It should be included in the cost estimate. This relatively large tax may have other costly effects that should be evaluated. Will the tax decrease the size of the affected sectors? If so, will support industries, such as the drilling industry, be negatively affected?

Data Requirements: The size of the industry affected relative to the amount of tax that would be collected. Information about its financial health and the ease with which costs can be passed on to consumers and suppliers would also prove useful.

Proposals can also impose costs by placing restrictions on what companies can do:

Example
Airport zoning regulations would restrict the use of land within four km of a runway.
The Issue: What are the costs to business?
Approach: The proposed action restricts the use of private property. The road to the airport may be an important industrial/commercial corridor, with relatively high land values. The restrictions might reduce land values, especially if the area is already under development.
Data Requirements: Some knowledge of current use patterns in the area would be helpful. Investigate also the extent of planned future development around the airport.

Placing restrictions on the use of private property may be unfair. In addition, doing so may interfere with the demonstrated ability of private parties to allocate resources efficiently. Be sure to consider whether someone would be prevented from doing something in the future that might prove beneficial. Such costs can be difficult to quantify, especially since there may be no immediate impact. At the very least, make a note of such costs, and spend some time considering how they might be quantified.

Don't forget to look at the flip side of the "competitiveness" coin. We would like companies operating in Canada to be focused on opening up new markets and looking for better ways to satisfy customers, and not on protecting existing markets and discouraging competition. Since the amount of competition has an influence on the competitiveness of Canadian firms, we should take notice, and we should be concerned, if a proposal might make it easier for companies to cooperate in ways harmful to consumers or other businesses.

For proposed actions with smaller impacts, you may find that "Costs to Business" can be used as a proxy for the costs that all Canadians ultimately pay. As noted in the introduction to this chapter, some cost increases to firms will be passed back to suppliers. Others will be passed forward to customers. Still others will be paid by the firms' employees or owners. Sorting out who will have to pay what can be extremely difficult, and sometimes quite impossible. If the direct costs will be faced by a well-defined group of firms, you may find it best to focus only on them.

You may think of other ways in which one or more of the alternatives you are examining might inhibit the ability of businesses to keep producing, and you may want to analyze the issue in more detail. To help you decide, use the following Quick Test. If you answer "yes" to any of the following questions, you should consider consulting chapter 6.

Quick Test on Impacts on Business

- ☞ Would the proposed action affect operating costs or business conditions for firms operating in Canada?
- ☞ Would the proposed action make it more difficult for Canadian firms to respond to changing market conditions? For example, would it be harder to introduce new products or change existing products in ways wanted by customers?
- ☞ Would the proposed action impose requirements on firms in Canada that competing firms outside the country would not have to meet?
- ☞ Might the amount of competition between firms decrease?

Costs to Consumers

Many regulations affect the price, quality, or availability of consumer goods. These effects should be examined carefully, because often consumers will be reluctant to get involved to express their interests. To see why, consider the following example:

Suppose a proposed action would result in a 5¢ increase in the price of an item that sells for \$25. If the item is purchased about once a month by some five million consumers, the total annual cost increase faced by each consumer is an unimpressive 60¢. Each of our consumers is unlikely to put up much of a fuss. However, the total impact is rather more impressive -- \$3 million annually.

Each of our hypothetical consumers is unlikely to get involved because the cost of doing so is sure to be greater than the anticipated benefit. But from the point of view of society as a whole, it may make sense to question the proposed action, since its anticipated costs are very high. In other words, government can sometimes express the interests of consumers more efficiently than consumers can. If individual consumers are unlikely to get involved, then government should make sure that their interests are taken into account.

Of course, in the event that benefits are significant, it may make sense to increase costs to consumers. The point is simply that because total costs can be so high, it's worth taking a close look at them.

Evaluating impacts on consumers can be tricky, since they rarely respond passively to changes in price or availability. If the proposal would lead to an increase in price, consumers will normally buy less of the good, and possibly more of something else instead. In some cases, reactions can be as extreme as smuggling or tax evasion. Analysts should take a broad look at how consumers may react under each of the alternative regulatory and non-regulatory approaches being examined. It may not be in the interests of individual consumers to react politically, but they will almost always act "economically" by changing their buying habits. The resulting behaviour can surprise both firms and governments.

To illustrate how analyzing impacts can become complicated, consider a proposal that would increase production costs for widgets by 10¢ per unit. Suppose also that widgets are not traded between countries, and that currently one million widgets are sold each year. The simplest thing to do is to assume that all of the increase in production costs would be passed on to consumers, and that the number of widgets (and all other items) sold would be unaffected by the change in price. Total costs to consumers would be 10¢ times one million, which equals \$100,000 per year.

Our easy-to-calculate estimate is of course imperfect, since our assumptions undoubtedly oversimplified things. Our analysis might be extended in either of two ways. We might:

- try to figure out who among suppliers, producers and consumers would pay how much of the increase in production costs; and/or
- consider how the quantity sold and price would change for widgets and other related goods (the demand for smidgets, which work a lot like widgets, would undoubtedly increase, for example).

You might extend your analysis in either or both ways for proposals with larger impacts. As noted earlier though, be sure to avoid double counting when you are apportioning costs among consumers, producers, and suppliers.

Some proposals can affect the availability of consumer goods. Prohibiting the sale of dangerous products or placing restrictions on where goods may be sold are examples. Analyzing these kinds of proposals can be difficult. Clearly consumers benefit as the number of competing options increases, but it's hard to put a price on the value of choice.

To help you decide whether to look at impacts on consumers in more detail, calculate rough estimates for the change in price for those consumer goods that would be affected directly, and multiply these values by the quantities currently sold. If you

answer yes to either of the following questions, take a closer look at consumer impacts by consulting chapter 7.

Quick Test on Consumer Impacts

- ☞ Are the total costs faced by consumers as a group likely to increase by more than \$100,000 per year?
- ☞ Will the choices available to consumers be reduced significantly?

Costs to Government and Cost Recovery

Many proposals would require governments to allocate money to administer the program, to enforce any mandatory rules that would be established or to comply with new rules.

Most cost recovery proposals won't require governments to allocate money, but they should be examined in some detail to make sure they are well designed. If you answer yes to either of the following questions, consult chapter 10.

Quick Test on Costs to Government and Cost Recovery

- ☞ Would the proposed action require allocating money by any level of government in Canada to administer the program, enforce it or bring government into compliance?
- ☞ Is the proposed action part of a user fee or cost recovery program?

A Checklist

- For each alternative, have you considered costs to businesses, to consumers, and to governments?



5 FROM ESTIMATES TO INFORMATION FOR DECISION MAKERS

- Introduction
- Making the Transition
 - Discounting
 - Examining the distribution of benefits and costs
 - Assessing the reliability of your results
- Presenting Results

Introduction

By working through chapters 3 and 4, and applicable supplementary chapters, you should have collected a fair amount of information for each of the options you examined. For each option, you've estimated the value of a number of costs and benefits for each year of the time period you chose in chapter 3. Hopefully, you also identified something about those who would pay for each cost and receive each benefit. Due to uncertainty about one thing or another, some of your estimates may be in the form of ranges. In addition, you may have identified some benefits or costs for which you were unable to assign numbers.

Now, what are you going to do with the information you've collected? To answer that question, let's go back to chapter 1.

In chapter 1, we suggested that there is, or at least that there should be, a division of labour among analysts, the sponsoring department, and ministers:

- the goal of the **analyst** is to provide accurate estimates of what would happen if each proposal was implemented, including both regulatory and non-regulatory alternatives;

-
- the **sponsoring department** is required (by Treasury Board directive) to make the case in the RIAS that the proposal recommended to ministers is the best one, and that it is worthwhile (i.e., that the benefits justify the costs). The case must be based on the analysis; and
 - **ministers** decide whether the case is sufficient (i.e., whether the recommended proposal will be implemented).

By now, the job of the analyst is just about done. This chapter focuses on the role of the sponsoring department. It's about what has to be done after the estimating has been completed, and before the benefits and costs section of the RIAS is written. Most importantly, it's about how the information you collected can be summarized and presented to help decision makers within your department consider these questions:

Question 1: Which is the best option? and

Question 2: Do the benefits of the best option justify the costs?

Of course, the final judgment on both questions rests with ministers.

Making the Transition

Before writing up your analysis, you should consider whether the information you've collected requires further processing. Specifically, you may find it useful to perform any or all of the following tasks:

- discount estimates to take into account the importance of time;
- examine the distribution of benefits and costs; and
- assess the reliability of your results.

The rest of this section examines each of these tasks.

Discounting

Which would you prefer to receive: \$100 today or \$100 ten years from now?

Now, consider which you would prefer to pay: \$100 today or \$100 ten years from now?

Generally, people prefer to receive benefits earlier rather than later, and to pay costs later rather than earlier.

Because the value of benefits and costs depends on *when* they're received or paid, it's necessary sometimes to neutralize the influence of time before comparing them. Think about fractions. When you were about 10, you learned that before deciding which of two fractions was larger, you had to convert them to a common denominator. Think of discounting as converting all cost and benefit estimates to a common denominator. It is a technique that can be used to make numbers from different time periods comparable. Under certain conditions (more on that later) you'll have to discount your estimates before decision makers can determine whether any of the options should be implemented and, if so, which option is best.

Note that since it's better to obtain just about anything good today rather than tomorrow, discounting can be applied to all quantitative costs and benefits, and not just to those measured in dollars.

Use the following quick test to decide whether you should discount your estimates.

Quick Test on Discounting

☞ For each option, calculate the ratio of benefits to costs for each year of the time period you chose in chapter 3.

If the ratio of benefits to costs changes over time for any of your options, you should discount your estimates for all options. Consult chapter 11.

If the ratio is constant over time for all options, there's no need to discount your estimates; you can compare benefits to costs — and options to one another — based on your estimates for any year.

Examining the Distribution of Benefits and Costs

Even if all costs and benefits are measured in the same units, demonstrating that total benefits exceed total costs does not of itself imply that a proposal should be implemented. Why not? Because rarely will those who receive the benefits be the ones who pay the costs.

Indeed, if you wanted to be fair about it, you might think that demonstrating that benefits exceed costs would be sufficient justification for acting only if **everyone** gained — and believed they would gain — more than they lost. However, this doesn't seem

quite right either: if it had to be demonstrated that everyone would gain on balance before government acted, many things we take for granted would become quite impossible. It would be impossible, for example, to change bus routes (thereby affecting property values), or pick up the garbage (which must end up in some form in someone's back yard). Some are bound to lose, directly or indirectly, whenever government (or any organization, for that matter) takes action.

There are no clear-cut rules about when it's OK to redistribute costs and benefits, and when it isn't. What is clear, however, is that decision makers should be informed about the distribution of costs and benefits. As a result, you might want to do some further analysis. For example, you might want to examine whether those who would pay the costs would share (and believe they would share) in the benefits.

When examining the distribution of costs and benefits, consider whether what the government is proposing to do is fair. Fairness is a difficult concept to define and apply, but it's worth trying. For example, whether or not government should seek to open up competition for a market controlled by a single firm, and thereby harm the monopolist, should depend at least in part on how the monopolist gained the advantage. If it was based on good performance, the market should probably be left alone. On the other hand, if it's based on some arbitrary rule that precludes competition, then it may be quite fair to remove the rule. Whether or not it's fair to take something away from someone depends on how it was obtained in the first place.

In short, since decision makers will want to know about distributional effects, you should take a look at who wins and who loses. You might also find it useful to examine the reasons why some would gain while others would lose.

Assessing the Reliability of Your Results

The answer to question 1 (which option is best?) or question 2 (do the benefits of the best option justify the costs?) may depend on the value of uncertain variables, or on the accuracy of particular assumptions. Examine whether this is so. If it is, you might want to do some more sensitivity analysis (see chapter 3).

If your conclusions are uncertain, you might also consider whether collecting more information would improve things. See whether you can reduce the uncertainty of key variables, or test the accuracy of key assumptions.

Presenting Results

Your goal is to summarize options (including doing nothing) in a way that facilitates decision making.

Recall that in the RIAS the case must be made for two things:

- that the best option among all regulatory and non-regulatory alternatives was chosen; and
- that the anticipated benefits of the preferred option justify the anticipated costs.

The benefits must be lined up against the costs, and the options lined up against one another, and the case must be made that the proposed action is in the best interest of Canadians. Moreover, the case must be based on your analysis of anticipated impacts.

When presenting your results, consider the following:

- across options, try to focus on where they differ, i.e., when comparing options, ignore consequences that are common to all of them;
- don't forget to describe and discuss any non-quantified benefits or costs;
- be sure to provide information about who wins and who loses;
- report key assumptions and the results of any sensitivity analysis you undertook. In particular, if the answer to either question 1 or question 2 depends on uncertain variables or specific assumptions (i.e., if your conclusions are not robust), explain how; and
- if you discounted:
 - be sure to report your estimates for all quantitative costs and benefits as present values, i.e., in terms of the current year; and
 - as explained in chapter 11, you should have completed a sensitivity analysis based on the discount rate. Be sure to report the results.

After the case has been made that the government should do something, judgment is still needed, if only because the units for all benefits and costs are unlikely to be the same, or because the winners differ from the losers. In our democracy, ministers make those judgments on behalf of Canadians.

A Checklist

- Did you take another look at who will obtain the benefits and who will pay the costs? Did you report this information in summary form?
- Have you looked for questionable assumptions or uncertain variables? If you found one or the other, did you examine them?
- Did you include information about any non-quantifiable benefits or costs in your write-up?
- If your conclusions depend on uncertain variables or particular assumptions, does your summary explain how?
- If you discounted, did you conduct a sensitivity analysis on the discount rate, and did you report the results?

6 IMPACT ON BUSINESS

- Introduction
- Issues
 - The Ability to Compete, Innovate and Adapt
 - Paperburden
 - Competition within Canada
 - Competing with Firms Located Abroad
 - Macroeconomic Effects
- The Business Impact Test

Introduction

As noted in chapter 1, the Regulatory Policy requires that regulatory programs be structured to maximize gains to beneficiaries in relation to costs imposed on Canadian governments, businesses and individuals. Further, steps should be taken to ensure that regulations impede as little as possible Canada's competitiveness.

The policy does **not** imply that Canada should have the weakest regulations, or be the last jurisdiction to adopt measures to protect the health and safety of Canadians or the environment. The government has made it clear that Canada will continue to play a lead role in these and other areas. But the policy does imply that these goals should be pursued wherever possible in ways that do not inhibit the private sector's capacity to generate wealth, as that capacity is directly linked to our ability to pursue social objectives.¹

1. For more on the relationship between competitiveness and regulations, see *Competitiveness and the Design of Regulations*, available from Regulatory Affairs, Treasury Board Secretariat at (613) 952-3459.

The World Competitiveness Report defines business competitiveness as "the ability to design, produce and market goods and services, the price and non-price characteristics of which form a more attractive package than those of competitors."² Ultimately, it is firms that are or are not competitive, but governments can help or hinder them through their influence on:

- the legal system which provides the framework for making and enforcing market transactions;
- budgetary allocations, debt structure, taxes and monetary policy;
- the regulatory burden borne by organizations and individuals;
- funding levels for universities and research and development;
- the rules governing relations among workers, managers and owners;
- the work of research institutes and their relationship to industry; and
- infrastructure investment in communications networks, roads, railroads, air terminals and waterways.

The next section discusses five issues that may arise as you examine impacts on business. The chapter ends with a brief description of the Business Impact Test, a software-based consulting tool that helps examine these issues.

Issues

The Ability to Compete, Innovate and Adapt

There are a wide range of factors to consider when you assess how a proposal will affect businesses. Most of these factors can be divided into two main groups.

First of all, there are direct impacts. These are usually fairly easy to estimate. As outlined in chapter 4, direct impacts refer to the things that interest accountants, such as the cost of labour, energy or land.

The second group is made up of indirect effects. Proposals can influence business conditions or opportunities. It is difficult, but necessary, to examine these effects, because they can have a dramatic impact on the ability of firms to compete and stay in business. A proposal that would make it more difficult for companies to seek financing, for example, might lead weaker firms to fail.

2. Alan M. Rugman and Joseph R. D'Cruz, *Fast Forward: Improving Canada's International Competitiveness*, Report Commissioned by Kodak Canada Inc., 1991, page 12.

Here are some questions you should ask to identify direct and indirect impacts:

1. Would the proposal affect operating costs, or the cost, quality or availability of inputs?
2. Would the proposal require affected firms to make operational changes? Would they have to hire, redeploy or dismiss personnel? Would they have to add, modify, or close down existing capacity or equipment?
3. Would it affect the general business conditions facing firms? For example, would it prove more difficult to undertake joint ventures?
4. Would the proposal create uncertainty? In other words, is it clear what businesses will have to do to meet any requirements imposed on them?
5. Are the requirements more complex than they need to be? Are they consistent with standard business practices?

You should also examine whether proposals would affect the capacity of firms to innovate, or to adapt technologies developed elsewhere. These impacts are also difficult to quantify, but they are important, since they lie at the heart of a firm's ability to grow and create jobs.

In the short term, how innovative a company is may not register on the bottom line. But impacts on innovation can be very important, and sometimes critical, over the longer term: this quarter's results don't mean very much if the firm won't be in business two years down the road.

Being a bit ahead of the competition can prove very profitable. Process innovations reduce the cost of producing goods and services, while product innovations improve on existing products or invent new ones. Obviously, both kinds of innovation lead to increased competitiveness. Indeed, competitiveness can be maintained over the short run by being efficient, but innovation is needed to survive and thrive over the longer term.

There is considerable debate about what governments can and should do to support innovation. It has been argued that regulations can both help and hinder the process.

We won't get too deep into the debate here,³ except to note that everyone pretty much agrees that firms shouldn't be prevented from seeking out better ways of doing things.

More innovative firms are clearly more likely to be able to keep producing. To examine the effect of a proposed action on innovation, try asking the following questions:

1. If the proposal includes detailed requirements, would these make it difficult for firms to innovate? If so, might the government's public interest objectives be satisfied in a less prescriptive way?
2. Does the proposal help develop a climate where organizations seek new ways of doing things? For example, the approach used to regulate cellular phones in Canada helped supplier companies become internationally competitive by developing new products wanted by their Canadian customers.
3. Would the proposed action make it more difficult for Canadian firms to enter into strategic alliances with domestic or foreign firms? Would it, for example, make it harder to carry out cooperative research?
4. Would it prevent the introduction from abroad of innovative products or process improvements wanted by Canadian firms? Don't forget that Canada will never account for more than a small amount of the world's innovations. Consequently, being innovative means to a great extent being able to adapt innovations developed elsewhere.
5. Would the proposed action make it more or less difficult for employees to acquire the skills they need today and will need tomorrow?

Paperburden

Business people frequently complain about the time and expense involved in obtaining, maintaining and providing information required by governments, including the many forms that must be completed for one reason or another. If your proposal imposes bureaucratic requirements on businesses, be sure to include the time it takes to meet them as a cost.

Critics sometimes complain that it is not any particular requirement that is the problem, but the sum total of all of them. This is a bit puzzling, since it isn't obvious that adding

3. For a more detailed account that includes examples of a number of particularly good regulatory programs, see *Competitiveness and the Design of Regulations*, available from Regulatory Affairs, Treasury Board Secretariat at (613) 952-3459.

another form would increase the cost of completing the paperwork already required. On the other hand, if most of the regulations that require forms provide little or no benefit to those who have to fill them out, then the sum total may represent a sizeable burden. Critics may be saying that they are prepared to do some work for others, but not to spend an unreasonable amount of time doing it. So, when deciding whether to add another requirement, find out how much the businesses you will target are already required to do, and consider whether they will obtain any benefit from your additional request.

Be sure to look for indirect effects. For example, suppose all drivers over 70 were required to obtain a certificate of good health each year. Indirect costs might include extra visits to the doctor as well as the time needed to fill out certificates.

1. How consistent are any administrative requirements (reporting requirements, paperwork, etc.) with standard business practices, information systems, or accounting procedures? Could they be made more consistent to make it easier for businesses to comply?
2. Have you looked at whether any bureaucratic requirements contradict obligations that firms must meet for other departments or governments?
3. Have you examined whether the information you are seeking is collected by another department or government? If so, can you obtain it from them?

Competition Within Canada

A competitive market (i.e., one characterized by competition) contains many firms competing for the same customers. No individual company or collection of companies is able to control either price or supply, and entry into the market is reasonably easy. In Canada, gas retailing would qualify as a (reasonably) competitive industry, while electricity generation would not.

Just about everyone gains from competition. It helps consumers directly by keeping prices down and quality up. It helps them indirectly by encouraging companies to search for new and better products, and for more efficient and less expensive production methods.

Competition also gives smaller companies with new ideas the opportunity to grow. In addition, open markets keep firms connected with the rest of the world, leading to export opportunities.

To say that competition benefits everyone isn't quite right, however. Companies able to influence market prices, either by themselves or in cooperation with other companies, can be very profitable, especially if entering the market is difficult (i.e., if there are entrance barriers). So, while it's not always true that competition leads to competitiveness over the short term, over the longer term, it becomes increasingly difficult for a firm to remain internationally competitive if it spends lots of time and energy avoiding competition. Over the longer term, then, having a competitive market leads to stronger companies better able to compete internationally.

When you get down to it, we would all prefer that everyone else had to compete, while we ourselves had monopolies. That, of course, isn't possible, so we have to settle for the next best thing, which is to encourage competition everywhere. The argument here is much like the argument used to support free trade: we might prefer to restrict access to our market from other countries, but we don't want to be restricted from selling to other countries. Since it isn't possible for everyone to get what they want, everyone compromises and promises not to impose restrictions, or to impose them only in very specific circumstances.

Governments can support competition in a number of ways. First of all, most countries prohibit certain kinds of anti-competitive behaviour, such as price-fixing. Secondly, governments can avoid creating barriers that make it difficult for new firms to enter markets.

Try asking the following questions to find out whether a given proposal would make things more or less competitive, keeping in mind that more competition is almost always better:

1. Would the number of firms be reduced? If so, could the remaining firms use their market power to increase prices (losing one of one hundred competitors may not matter, losing one of five may matter a great deal)?
2. Would the proposal make it more difficult for firms to enter any market?
3. Would the proposed action limit the free movement of goods or services between provinces?
4. Would the proposal disconnect the Canadian market from the international market?

Competing with Firms Located Abroad

Firms don't stay in business very long if their costs are higher than their competitors, and they don't stay put if it would be cheaper to move.

Of course, production costs depend on a great many things, including the productivity of the labour force. Moreover, for some goods and services, product quality may be as important to consumers as price. Nonetheless, the bottom line really is the bottom line: if the costs of complying with regulations are much higher in Canada than they are elsewhere, companies will be less inclined to locate here, and those that are here may be more inclined to leave.

Here are some questions to help you decide whether your proposal might have an adverse effect on the capacity and willingness of firms to produce in Canada:

1. Are the goods or services that would be affected traded between countries?
2. Would the proposed action affect imported and domestically produced goods or services in the same manner and degree?
3. Would the proposal impose costly requirements unique to Canada? If so, are there alternatives such as harmonization with major trading partners or the use of international standards?
4. Do firms see the proposal as a significant burden? Would the costs imposed on business make up a significant proportion of value added in Canada?
5. Would the proposal discourage foreign firms or individuals from investing in Canada?

Example

The *Oil Pollution Prevention Regulations* prescribe a maximum tolerance for oil discharge and set standards for pollution prevention equipment to be used aboard ships operating in certain Canadian waters and fishing zones. By enacting these regulations, Canada is meeting requirements under the International Convention for the Prevention of Pollution from Ships (MARPOL).

The Issue: Would the proposed action affect the competitiveness of domestic firms?

Approach: Find out whether Canada's major trading partners already meet MARPOL standards.

Data Requirements: Verify whether major trading partners are among the 70 countries already party to MARPOL. Examine how a selection of parties have implemented the treaty requirements.

If you think Canada's competitiveness might be adversely affected by a proposal, try comparing it to existing requirements from other jurisdictions. Would the requirements proposed in Canada prove more costly to meet? If so, is the difference significant? Would Canadian firms be tempted to relocate production somewhere else? Some comparative numbers might be presented as part of your analysis. Certainly ministers will want to know about the relative stringency of the proposed action. Be sure to focus on jurisdictions which include firms competing directly with those located in Canada.

When comparing the proposal to existing requirements in other jurisdictions, find out about how requirements elsewhere are implemented. Programs may turn out to be more or less costly than they appear "on paper."

Note that just because compliance costs would be higher in Canada than in other countries doesn't mean that the proposal should be abandoned, since it may offer significant benefits. But identifying high compliance costs should lead you to think about how companies are likely to react, and to search for less expensive alternatives.

Note also that Canada's competitiveness shouldn't be viewed as synonymous with the financial health of one or a selection of companies. Recall, for example, that supporting competition can be both good for the country and bad for monopolists. Your focus should be the Canadian economy as a whole. So, for example, consider whether the proposal would make the Canadian market more or less competitive.

If you would like to obtain detailed information on how businesses view the proposal, and on how they would be affected, you might want to use the Business Impact Test (BIT), described in the next section.

Macroeconomic Effects

Intermediate-cost initiatives are most unlikely to have measurable effects on such things as the unemployment rate, total wages, inflation, total output, or the international flow of capital. On the other hand, some major regulations may have measurable macroeconomic effects that should be considered. The requisite analysis, however, is well beyond the scope of this guide. Note, though, that ministers will want to be informed of *any* anticipated job losses. Be sure to examine whether proposals are likely to have any effect on employment.

The Business Impact Test

The Business Impact Test (BIT) is an interactive, software-based consulting tool designed to help governments understand and assess how regulations impact on business. The test can be used to identify direct costs, and also to examine how regulations affect the way firms operate, organize and innovate. As part of the analysis of proposed actions, the BIT can be used to develop a deeper understanding of how businesses would be affected.

The test focuses attention at the firm level, and can be used in a number of different ways in the search for more effective and efficient approaches to regulation:

- as a consultative tool, the BIT increases the efficiency and effectiveness of consultations with industry. It provides a consistent, structured way to examine the concerns of businesses. It can be used to clarify areas of agreement, and to ensure that, to the greatest extent possible, government and industry speak the same language.
- as a tool to assess alternatives, the BIT helps regulators identify less burdensome alternatives that are equally or more effective in satisfying the government's objectives.
- as an analytical tool, it can serve as a preliminary screen to identify potential impacts that require more detailed analysis.

Departments are encouraged to use the BIT when examining proposed actions as well as existing programs.⁴

4. For more information on the BIT, contact Regulatory Affairs, Treasury Board Secretariat at (613) 952-3459.

A Checklist

- Have you examined whether the proposal will impose additional costs on firms operating in Canada?
- Have you evaluated the proposed action in terms of its effect on innovation?
- Have you examined the anticipated effect of the proposal on the amount of competition?
- Have you considered whether the proposed action is consistent with the requirements of other governments in Canada and abroad?
- Have you examined whether the proposal would have any effect on employment?

7 CONSUMER IMPACT ASSESSMENT

- Individual Consumers and the National Economy
- Calculating Costs to Consumers
- Other Impacts

Individual Consumers and the National Economy

The focus of this chapter is on the assessment of the direct and indirect costs of proposed actions on individual consumers. However, analysts should realize that there are implications for the national economy as well. After all, consumer spending represents about 60 per cent of the total value of domestic production each year.

As noted in chapter 4, a proposed action that raises the price of a single item just a little can have a significant effect, taking into account the cumulative impact of millions of transactions. Similarly, proposed actions that reduce the options available to consumers can have large effects on the supply or the demand of goods affected both directly and indirectly. For example, restrictions on what can be produced or sold in Canada may lead to an increase in cross-border shopping, which may in turn decrease the demand for other goods sold in Canada.

Chapter 4 also noted that government may have a special responsibility to consider the interests of consumers, given that individual consumers rarely express their concerns or join consumer groups. Direct involvement by consumers is rare because the cost to the *individual* consumer of getting involved in a particular issue is almost always greater than the potential gain. In theory, consumer interest groups should be able to pick up the slack, but few consumers actually join them.¹

1. There may be a very rational reason for why few consumers join such groups: all consumers, and not just members, normally gain from group victories. As a result, there is little incentive to join. The problem is that since membership is low, there are fewer victories than there should be.

On the other hand, firms may be more motivated and better able to form industry associations to express their common interest to government, especially in industries dominated by a few firms.

These considerations are not intended as an indictment of business or any other kind of interest association. Our intention is simply to show that, by considering the choices individual consumers face whether or not to get involved, a role for government can be identified.² In addition to balancing competing representations, departments may also have a role in identifying, evaluating and expressing the interests of consumers.

If the prices or availability of products change, consumers will inevitably change what they buy. Hence, in order to estimate costs and benefits, analysts should try to anticipate how consumers are likely to react should the proposal be implemented. This can be the analyst's biggest challenge. Even though individual consumers are unlikely to express their views to government before proposals are implemented, if prices or the range of products change, consumers are sure to make their preferences known after by changing how many of what products they purchase.

Calculating Costs to Consumers

Remember to avoid double counting. If you estimated increased production costs when you examined "costs to business," don't count again the portion that would be paid by consumers. What you might do instead is partition costs between businesses and consumers based on who will end up paying how much of the bill.

There are a number of very good reasons for taking the time to supplement your analysis of costs to business by examining proposed actions from the point of view of consumers:

- by looking at supply and demand, it's possible to examine (and perhaps even estimate) the anticipated change in both market price and quantity sold;
- distributional impacts can be examined (who among consumers and producers will end up paying more); and

2. For a more complete discussion of the problems consumers face in expressing their interests, see Mancur Olson, *The Logic of Collective Action*, 1965.

-
- it provides a solid foundation for measuring the influence of proposed actions on public welfare.³

The remainder of this section provides an overview of how to analyze consumer reactions to proposed actions. In practice, the more detailed your analysis is, the more difficult and expensive it will be. To help you decide the right level of detail, you might want to review the four guidelines offered in chapter 3.

For illustrative purposes, consider a proposed action intended to increase the safety of baby strollers sold in Canada by specifying standards that must be met by manufacturers. Producing to higher standards will entail higher production costs, while benefits will come in the form of fewer injuries. To keep things simple, we will assume that all strollers sold in Canada are made here.

How should we go about calculating costs to consumers?

As a first step (i.e., to get a rough estimate of costs to consumers), we might estimate the increase in production costs per unit and multiply this by the number of units currently sold.

What assumptions have we made, and are they reasonable? Here are two of them:

- all of the increase in costs would be passed on to consumers; and
- the quantity sold would be unaffected by the price increase.

Both assumptions oversimplify things. In fact, the change in both the price paid by consumers and the quantity sold depend on the price elasticity of supply and the price elasticity of demand.

Dealing with elasticity can get quite technical. In the spirit of this guide, we'll avoid the technicalities by discussing a related concept that is a little more straightforward: options. To do that, pretend you are the only person looking for an apartment in a town with a high vacancy rate.

You've got a lot of options, while your prospective landlords do not. Suppose that while you are looking for an apartment, new regulations are passed which require the installation of new safety equipment in all apartments for rent. Obviously this will increase the cost of supplying an apartment, but will it also increase the monthly rent

3. A complete analysis would examine the impact on consumers' and producers' surplus for all markets that would be affected. Carrying out analysis at this level of detail can be extremely expensive, however.

your potential landlords are asking for? Since you can shop around while all the landlords want your business, they probably will be unable to pass on their increase in cost to you. The cost of supplying apartments will go up, but rents probably won't.

Now suppose there is just one landlord and lots of prospective tenants. Who would pay for the new safety equipment under these conditions? No doubt rents would go up and tenants would end up paying most of the cost of the new equipment (though not all at once, of course).

The elasticity of demand for an item is, more or less, a measure of the number of options consumers have. Somewhat more precisely, it is the extent to which consumers need to purchase the item. A small increase in the price of gas doesn't have much of an effect on demand, so the demand for gasoline is said to be inelastic. On the other hand, most consumers don't really need to purchase something like apple juice; if the price went up, many consumers would buy some other kind of drink instead. As a result, the demand for apple juice is said to be elastic.

Consider baby strollers again. Consumers would seem to have a number of options: they might keep their old strollers a little longer, cross the border to purchase one of the models excluded from Canada, or adapt the family wagon to serve as a substitute.

Viewing elasticity in terms of options can also be applied to producers. The elasticity of supply is (more or less) a measure of the number of options producers have. Somewhat more precisely, the elasticity of supply of a particular good is a measure of the extent to which producers are inclined to continue producing. The supply for fresh milk is said to be inelastic, because once the relatively expensive cows have been acquired, it's rather inexpensive to generate milk. On the other hand, the supply for some plastic products is elastic, since it's relatively easy to retool factories to produce something else.

In the event that production costs go up, the key to determining both what proportion of the costs consumers will pay, and how much the number of units sold will go down, is to consider the options of consumers and producers. Here are two useful generalizations:

- the party that has fewer options is more likely to end up paying more. So, for example, if consumers have relatively more options than producers, businesses may try to absorb the cost increase by becoming more efficient, reducing profit margins, or arranging better terms with suppliers. Alternatively, they may decide to go out of business; and

-
- the more options for consumers or producers, the more the number of units sold will go down if costs go up. In other words, across producers and consumers, more options translates into more of a reduction in sales in response to cost increases.

To calculate our simple estimate for costs to consumers, we also assumed that the quantities sold and prices of all other goods would be unaffected. This assumption may also prove wrong. The demand for orange juice would probably go up if the price of apple juice went up, for example. Clearly the demand for closely related goods would be affected.

The demand for completely unrelated goods may also be affected. A cost increase may either increase or decrease the total amount of money spent on the good in question, since price will go up while quantity sold will go down. If the total (price times quantity) goes up, the amount of money available to purchase other goods will go down, while if the total goes down, the demand for other goods will increase.

The following questions may prove helpful when examining how costs will be shared between consumers and producers, and how consumers would react should a proposal be implemented:

- what alternatives are available to consumers? How much more attractive would these become?
- can consumers do without the good (there are, for example, relatively few substitutes for fresh milk)?
- if there are no readily available alternatives, could illegal behaviour or an underground economy develop?

Based on your answers to these questions, you can extend your analysis in two ways. First of all, your estimate of total new costs faced by consumers can be improved by using more realistic estimates for price and quantity sold. Secondly, you may want to include products that would be affected indirectly.

Example

The *Quebec Maple Syrup and Maple Sap Order* regulates the sale of maple products produced in the province and marketed in bulk. This includes the right to collect levies from individual producers to pay for storing product withheld from the market.

The Issue: Who is paying for the storage of unsold product i.e., are producers able to pass the levies on to consumers?

Approach: Quebec accounts for 60-70 per cent of the world's maple syrup production. If producers are able to act in a concerted way, they may be able to exercise considerable influence over prices.

Data Requirements: How much do Canadian consumers rely on maple products covered by the order? Are there alternative sources of supply or products with similar attributes?

In your attempt to predict consumer reaction, don't forget to consider benefits as well as costs. For example, introducing standards for bicycle helmets may lead to higher prices, and thus fewer sales. As a result, benefits received in the form of injuries avoided may not be as high as it might first appear. On the other hand, safety-conscious consumers might replace their helmets as soon as the new ones are available, leading to higher benefits.

Examining consumer impacts in detail can get quite complicated. Moreover, it can be difficult to get good data on the relationship between prices and the behaviour of consumers and producers. As a practical matter, you may find it most effective, and certainly easiest, to examine costs to business without worrying about who ends up paying the bill. However, you should give some thought to how consumers might react, for in some cases this will prove very important (the example of cross-border shopping has already been given). And don't forget the moral of the previous section: the interests of consumers deserve some attention. For larger proposals, you should examine consumer impacts in some detail, especially if, as noted in chapter 6, the proposal would influence the amount of competition in the Canadian market.

Other Impacts

Proposed actions may have additional effects on consumers that are difficult to quantify. To identify such effects, you may find the following questions helpful:

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- will the information available to consumers about the price or quality of goods or services be affected? If so, will consumers find it easier or harder to compare products and decide what they want?
 - in the event that consumers are treated unfairly, will access to redress through the courts or elsewhere be affected?
 - will the choices available to consumers increase or decrease?
 - will consumers be prevented from purchasing a product that they would otherwise want?

The last question may prove to be the most important: unless a role for government can be identified, it should be consumers, and not governments, that determine what is produced.

You may also find that dividing up costs between producers and consumers may provide insufficient detail. You may also want to examine the characteristics of the consumers who would end up paying more:

- how will costs be distributed among income groups? Will those least able to pay face significantly higher costs for essential items?
- will the costs be concentrated on particular regions or groups?

Any or all of these "other impacts" may turn out to be important. You should report any concerns you identify, and you might try to follow up with some quantitative analysis.

A Checklist

- Have you identified what consumer interests are at stake?
- Have you estimated costs to consumers by examining the more important effects on markets for goods and services that would be affected both directly and indirectly?
- Have you examined any effects on the choices, information or means of redress available to consumers?
- Have you examined the characteristics of the consumers who would be affected?

8 THE EVALUATION OF RISK AND UNCERTAINTY

- Introduction
- The Perception of Risk
- Evaluating the Benefits of Risk Reduction
- The Value of Life

Introduction

There is a big difference between saying that something *could* go wrong and knowing that it *will* go wrong. The evaluation of risk and uncertainty addresses the former: situations where you aren't sure what will happen to whom, but where you have a pretty good idea that something bad could happen to someone.

There are all sorts of risks facing Canadians: speeding cars, smoke-filled rooms, communicable diseases, bank failures, natural disasters, job losses, etc. Government intervention can reduce some or all of these risks, at a cost. We cannot prevent any of these things from ever happening, but we can spend money to reduce risks. The sensible thing is to reduce them for as long as (and only for as long as) all of the benefits of doing so outweigh all of the costs.

Risk and uncertainty are often treated as interchangeable terms. This can cause some confusion. A useful distinction can be made between the two terms.

The distinction can be made based on a very simple example. Suppose I am not very computer literate (a safe assumption), such that there is a pretty good chance that I will erase the file containing this guide when I next try to save it. Suppose also that it would take me 100 hours to recreate the guide should I erase it.

A situation is said to be risky if the probability of the bad thing happening is known. It is said to be uncertain if the probability is unknown. Whether the situation I am facing

is risky or uncertain depends on whether I know the probability that I will erase the file (so far, I have only said that there is a pretty good chance that I will erase it).

Suppose I do know the probability, and that it is 0.1, i.e., I will, on average, erase the file one out of ten times. Now I can calculate the risk I will be taking when I try to save it, which is defined as the probability times the consequence, or $0.1 * 100 \text{ hours} = 10 \text{ hours}$. I don't know whether I will lose the file, but I do know that the expected outcome or risk is 10 hours, i.e., on average I will lose 10 hours of work.

I may find this level of risk acceptable, or I might try to reduce it. For example, I might make a backup of the file each evening, thereby reducing the consequence of erasing my working file. Alternatively, I might get someone who's more computer literate to save it for me, thereby reducing the probability of erasing it.

It is not possible to calculate the risk under uncertainty, since one of the two numbers needed for the calculation (the probability) is missing.

Government finds itself dealing with both risk and uncertainty. Automobile accidents can be examined in terms of risk, since information is generally available about the probabilities and consequences of accidents. Global warming can at present best be understood as uncertain, since it is not yet possible to estimate with any sort of confidence the probability that it is occurring.¹

Managing risks on behalf of others can prove very difficult for a lot of reasons. First of all, the technical assessment of risks can be exceedingly difficult (there are degrees of uncertainty). Secondly, and perhaps more importantly, opinions about what risks are acceptable and who should bear them vary widely across the population, and often the risks that matter to the public are not the same risks that concern technical experts. As a result, communicating about risks can be as important as trying to reduce them. Clearly, decisions should be based on both the best available technical information, and also on how risks are perceived. We offer a few guidelines below.

The Perception of Risk

As noted, the seriousness of the risk as perceived often differs substantially from its seriousness as measured. Smoking is many many many times riskier than eating

1. To say that something is uncertain does not directly imply that nothing should be done about it. Take the case of global warming. If we know that not acting today might have drastic consequences in the future, then it might make sense to do something now, even though we aren't sure that warming is occurring.

foods sprayed with the most dangerous pesticides,² and driving a car is in the range of 10 times riskier than taking a plane. Clearly our perceptions are based on more than probabilities and consequences.

One of the things that affects how people think about a given risk is the extent to which the person taking it is in control. People are generally more willing to take a risk if they can influence how much of it they are taking. That may explain the difference between driving and flying.

Other factors known to increase perceived risk are lack of familiarity and the extent to which the risk evokes a sense of fear or dread.

What are the implications of the tension between perceived risk and actual risk?

First of all, if the risk is taken voluntarily, and if those exposed to it are well informed, maybe there is little reason for the government to do anything at all. Perhaps we should let people decide how much risk they want to take. If the risk is taken voluntarily and the public isn't informed, maybe it makes sense to provide information.

Secondly, and to the extent possible, an attempt might be made to reconcile the two points of view. It doesn't make much sense to try to reduce very small risks just because the public thinks they are large. If you are confident in your estimates, perhaps you should focus on communicating them to the public. If, however, public concern persists no matter what information is presented, and if that concern would be alleviated through government action, then perhaps it would make sense to reduce even very small risks.

Most importantly, don't try to implement a program without knowing how the risk is perceived, and without thinking about whether the government can and should try to influence perceptions. If there is a wide discrepancy between estimated risk and perceived risk, you may place ministers right in the middle between technical experts and concerned members of the public. Faced with pressure from two irreconcilable positions, good decisions are unlikely.³

2. We were unable to find a definition of "many many many" after a quick review of the literature. Think of 1,000 times riskier as an absolute minimum. The actual number is probably much larger than that.

3. If you are looking for more information on risk perception, a good place to start might be a 1987 *Science* article by Paul Slovic called "Perception of Risk" (Volume 236, pp. 280-285).

Evaluating the Benefits of Risk Reduction

Doing risk analysis involves addressing three basic questions. Using the earlier example of my lack of computer skills, I need to ask:

1. What can go wrong? (I could erase the file)
2. How likely is it? (the probability is 0.1)
3. What would happen? (I would have to repeat 100 hours of work).

The goal is to estimate the expected consequence, or risk, which is calculated by multiplying the probability and the consequence ($0.1 * 100 = 10$ hours).

My example was very simple, while risk analysis can get terribly complicated. You may find that lots of things can go wrong, or that you have to consider multiple consequences. Alternatively, it may be difficult or even impossible to estimate the probability (i.e., substantial uncertainty may exist). In more complicated analyses, you will almost certainly want to consult more detailed sources or some outside help.

Risk analysis will allow you to establish the baseline, but your analysis will have to go further if you want to estimate the benefits that would result from reducing the risk.

First of all, you will need to identify different ways that the risk might be reduced. Consider, for example, road safety:

- requiring daytime running lights would reduce accident frequency;
- requiring the use of seat-belts would reduce the severity of the consequences of many kinds of accidents;
- banning pedestrians from highways might eliminate certain kinds of risks; and
- increasing compensation payments for accident victims might lead to safer driving, thereby reducing the frequency and severity of accidents.

For each of your options, you will need to estimate the expected change in risk. To do this, you might find it helpful to consider separately the effect of each option on the probability and the consequences.

Once you have calculated the risk under an option, you can calculate the benefit estimate as the difference between the risk with and without the option.

For example, suppose I made a backup of the file containing this guide at the end of each day. As a result, if I erased my working file the next evening, I would only lose one day's work. Assuming that I work eight hours each day, I would reduce the consequence from 100 to eight hours. The value of the risk under this option would be $0.1 * 8 = 0.8$ hours.

Recall that my estimate of the risk without the option was $100 * 0.1 = 10$. Therefore, the estimated benefit of backing up the file each day is $10 - 0.8 = 9.2$ hours. I can't say just yet whether I should implement my option, because I haven't considered yet how much it would cost.

To foreshadow, what you will want to do is estimate the benefits and costs of each of your options, and then calculate the ratio of benefits to costs for each of them. The higher the ratio, the better the option.

In my simple example, I used hours as my unit of measurement for the consequence associated with the risk. As a result, my benefit estimate was also in hours. You will be somewhat constrained in your choice of units by the kinds of consequences associated with your risk. Whether or not to translate your estimates to different units is covered elsewhere in the guide. For now, note that changing units may be both possible and useful. I could, for example, have translated my risk estimate to dollars by using my hourly wage. That might make it easier for me to compare the benefits of backing up the file each evening with the costs.

Textbooks, consultants, and even software programs for personal computers are available to help you analyze risks. In the coming years, the kinds of risk analysis now reserved for larger projects are likely to become more commonplace.

As noted earlier, a situation is said to be uncertain if it is difficult or impossible to develop reasonably accurate estimates for the probability. When you are dealing with uncertain situations, you might first try to reduce the uncertainty. Little information exists, for example, on how waste haulers handle toxic or dangerous substances. Rather than implementing new requirements designed to reduce an uncertain risk, the government might ask or require companies that haul waste to submit the information needed to assess the risk. If the risk is not significant, then introducing new requirements will do little more than waste taxpayer money. Learning more about the activity in question and its associated risks should also help identify good options.

Generally speaking, relatively low-probability high-consequence risks (like nuclear power plant accidents) tend to be more uncertain than high-probability low-consequence risks (like auto accidents). The reason is that usually historical data exists only for the latter. A number of approaches have been developed to examine

risks in the absence of historical data. These focus on the physical and technical characteristics of the systems that generate the risk, as well as the systems designed to prevent it. Great care is needed when applying these approaches, in part because it can be relatively easy to unwittingly introduce biases that can have a very large impact on estimated risk.

An Example

Under the Income Tax Regulations, financial institutions are required to set aside cash or other low-risk assets to protect them against doubtful debt. Past loans made to companies experiencing financial difficulties are examples of doubtful debt. An amendment to the regulations would increase the assets that financial institutions would have to set aside.

The Issue: How can the benefits be measured?
Approach: Lending money is risky. Consequently, there is a risk that individual financial institutions will fail, thereby having an adverse effect on the economy as a whole. It is necessary to examine both the probability and the consequences of the failure of financial institutions, and the effect that the amendment is likely to have on both the probability and the consequences.
Data Requirements: The analysis is bound to prove difficult, but there does exist lots of data on loan losses. This information can be applied to estimating the probability. Examining the consequences will prove more difficult, but it should prove possible to come up with some helpful estimates.

Another Example

The *Competition Act* prevents companies from certain kinds of collaboration (like price fixing) that would harm consumers. However, a regulation under the *Energy Supplies Emergency Act* exempts particular companies from parts of the *Competition Act* to allow them to participate in the Petroleum Industry Advisory Committee. This committee would prove very useful in the event of a future oil shock like those observed in the 1970s. The exemption is needed so that the committee can provide useful advice to the government.

The Issue: What is the benefit of having the committee?
Approach: Ideally, you would like to estimate both the probability of an oil shock as well as its consequences with and without the committee. However, calculating the probability will prove difficult, since there is lots of uncertainty.
Data Requirements: A lot of work has been done on the cost of the disruptions observed in the oil market during the 1970s. In summary, the costs were almost inconceivably enormous. Examining the literature would also help estimate the proportion of these costs that could be avoided by the work of the committee. The size of the consequences suggest that it doesn't really matter what the probability is: the exemption probably makes sense, although you should take a look at costs. This is a rare example of where looking at only part of the risk problem leads to a reasonably clear conclusion.

A Final Example

Suppose proposed safety requirements for step ladders would have a significant influence on the price of each ladder sold. Perhaps a significant proportion of consumers will decide to use more dangerous implements (like the old dining-room chair) rather than buy an expensive ladder. Other consumers may keep the older ladder a little longer than they would otherwise. The result may be that the number of accidents would increase rather than decrease.

We include this example as a reminder that when you are looking at benefits in terms of safety, don't forget to consider whether there might be safety costs as well. Probabilities can be affected by a variety of factors. Be sure to think broadly.

The Value of Life

Placing dollar values on lives is obviously both difficult and controversial. To argue, however, that the cost of programs designed to save lives is irrelevant is to imply that we should spend money for as long as lives can be saved. Since the risk of death cannot be reduced to zero, it would follow that society should spend all of its wealth on preventing deaths, which is clearly wrong. Pretending that we know the cost of life to the nearest dollar is obviously wrong, but so is arguing that it doesn't matter how much it costs to save a life.

A number of approaches have been used to estimate the dollar value of life. One approach is based on the observation that for both societies and for individuals, there is a fairly strong relationship between income and health: wealthier people live longer, and the members of wealthier societies live longer on average. As a result, taxing

individuals to pay for a health and safety program designed to save lives may, depending on the costs and benefits of the program, paradoxically cause more deaths than it will prevent, since this money is no longer available to individuals to make their own lives safer. Moreover, since the observed relationship between health and wealth is stronger among those with lower incomes, high-cost low-benefit programs may, depending on who ultimately pays for them, harm lower income Canadians most.

Here are a number of other approaches that have been employed to assess the value of life:

- ask people, either directly, or indirectly by presenting them with a series of choices;
- examine the relationship between wages and risky jobs. Statistical techniques can be employed to isolate the effect of risk on wages; and
- develop behaviour-based models to estimate how individuals use money to make their lives safer.

Estimates of the value of one life vary widely, from less than \$1 million to \$70 million. Most estimates are in the range of \$1 million to \$10 million. That may appear quite inconclusive, but there are numerous regulatory programs in the U.S. where the estimated cost per life saved is much higher than the highest estimates (i.e., much higher than \$70 million).⁴ In Canada, much less research has been done on the costs and benefits of health and safety regulations.⁵

A number of federal departments use explicit figures for the value of life. An alternative approach is to report an estimate of the number of lives that would be saved alongside program costs measured in dollars. In this way, the problem of valuing life is not avoided, but rather is clearly presented to those it most concerns: ministers and the public.

There are a number of related issues that are also controversial. For example, should the focus be on lives saved or years of life saved? Is saving the life of someone aged 70 the same thing as saving the life of an infant? Probably not. Presumably, the focus should be on the estimated number of years of life saved.

4. See, for example, Tengs et al, *Five-Hundred Life-Saving Interventions and Their Cost Effectiveness*, working manuscript from the Harvard School of Public Health, July 1994.

5. For more on the relationship between wealth and health, see "Health-health analysis: a new way to evaluate health and safety proposed action," *Regulatory Programs of the United States Government, April 1, 1992 - March 31, 1993*, page 19. For a review of different approaches to valuing lives, see Viscussi, W. Kip, *Improving the Analytical Basis for Regulatory Decision-making*, (Paris: Organization for Economic Cooperation and Development, 1993).

Finally, consider whether it matters *when* lives are saved. If you were working in a factory, which safety program would you prefer: one that would save 20 lives this year, or one that would save one life per year for 20 years? The former is surely preferable, since 19 people will live longer. The implication is that your estimates of lives saved should be discounted. At the very least, you should present a table that summarizes when lives will be saved.

No analytical approach can (nor should) eliminate the need for judgment. Departments should see it as their primary responsibility to present accurate estimates of health and safety benefits, program costs, and guidelines for how to compare benefits to costs. What to do with this information is ultimately a matter for ministers to decide.

A Checklist

- Have you looked at how the risk is perceived by the public?
- Have you considered whether it is taken voluntarily?
- Have you described what can go wrong?
- Have you estimated the probability?
- Have you listed the consequences?
- Have you calculated the present level of risk?
- Have you estimated the risk reduction that would result from implementing each option?



9 EVALUATING ENVIRONMENTAL QUALITY AND OTHER PUBLIC GOODS

- Introduction
- Three Ways to Evaluate Public Goods
 - Contingent Valuation
 - Travel Cost Analysis
 - Hedonic Pricing
- Deciding Which Approach to Use
- Cost Effectiveness Analysis

Introduction

A public good is something that is available to everyone free of charge once it is produced. Obvious examples are local roads and city parks. Since it is difficult to control access to public goods, and thus to collect money from those who benefit from them, profit-seeking firms aren't interested in supplying them. As a result, governments normally supply public goods using tax revenue. Because public goods are not priced in the market, it is difficult to estimate the benefits of supplying them, as will become apparent below.

A less obvious example of a public good is environmental quality. Once undertaken, many measures to improve the environment benefit everyone. Other examples include a fair tax system and low crime levels. In all cases, it would be impossible or nearly so to identify everyone who benefits and then charge them for the provision of the good. Using general revenue to pay for these public goods would seem to be a better alternative.

With market goods, the desires of buyers and sellers determine how much of each good is produced. Since there is no market for public goods, the government must decide how much should be supplied. How should it do that?

Clearly, a public good should be supplied for as long as, and only for as long as, the benefits obtained exceed the cost of supplying it. That's just common sense. However, to determine how much of the good should be supplied, governments must find a way to measure benefits, and this task can prove difficult.

Measuring benefits isn't easy because there is no market for public goods. If you need to know the value of a commercial good, like a watch or a pound of coffee, you need only look at the price tag. Estimating the value of a road, a clean environment or some other public good requires a little creativity.

In the early days of benefit-cost analysis, public good issues were largely ignored. So, for example, governments decided where to locate airports without giving enough attention to air and noise pollution. This approach is clearly wrong. Since the emphasis was placed on easily measured effects, some projects went ahead that probably shouldn't have, while others that should have been undertaken were rejected. So, while quantifying the benefits of supplying public goods like environmental quality can be very difficult, it can prove very useful.

A variety of techniques have been developed to value public goods. This chapter provides an overview of the more popular approaches. It is intended to help you:

- identify when you should consider non-market activities; and
- evaluate and apply the results of completed studies.

It does not provide the more detailed background needed to carry out such studies. For this information, you will need to consult specialized texts.

The chapter's primary focus is on environmental goods. Nonetheless, some of the approaches examined can be used to estimate the benefits of providing other public goods as well.

Environmental Benefits

The benefits provided by a clean environment can be divided into two types, as shown in the following table:

Use Values	Non-use Values
Drinking water	Preservation of the ecosystem
The air we breathe	Option value
Commercial wildlife harvesting	Bequest value
Recreational wildlife harvesting	
Non-consumptive recreation	

Use values include both goods extracted from the environment and recreational activities. They are immediate benefits.

Non-use values are benefits that might be obtained in the future. By not altering the environment today, we:

- prevent species loss and other damage that might prove harmful (preservation of the ecosystem);
- maintain the option of exploiting resources in the future in known and unknown ways (option value); and
- receive some satisfaction from passing on the land unaffected to future generations (bequest value).

Use values can often be examined in terms of market goods and services, either directly (e.g., by estimating the value of commercial fisheries) or indirectly (e.g., by using wage rates and the cost of travel to estimate the value of recreation). Examining non-use values is generally more difficult.

The approaches discussed next focus on non-market effects. They can be used to examine non-use values, and also, through the analysis of related market goods, some use values.

Three Ways to Evaluate Public Goods

Before deciding to apply complicated methods, be sure to consider whether you can use more conventional approaches. For example, before collecting data and asking people how much they value benefits, find out if the proposal would affect any

commercial activities. You can use more conventional methods whenever existing markets might be affected by the contemplated changes. Methods based on market goods are preferable because the actions of buyers and sellers in establishing market prices usually provide a very good indication of value.

Three approaches to valuing, that is, quantifying, public goods are discussed below. You may find that a combination of approaches will prove most helpful. You may also find that your quantitative analysis should be complemented by the qualitative assessment of some benefits. Your strategy will undoubtedly prove as important or more so than technical skill in applying the methods.

Employing any of the following methods can prove very complex and expensive. They are probably suitable only for major and more expensive intermediate-cost initiatives. However, you may find that it is relatively inexpensive to use the results of studies that have already been completed.

Contingent Valuation

This approach is undoubtedly the simplest one to apply. It is based on the straightforward assumption that if you want to know how much somebody values something, all you need to do is ask them.

How It Works

Suppose that a proposal would make a specific population better off. The cost is known, but you need to determine whether the benefits are sufficient to offset it. To make things more concrete, suppose the proposal is the creation of a new municipal park that would cost \$2 million. You would ask each resident how much he or she is prepared to pay for the new park, add up the values, and see whether the total is higher or lower than \$2 million.¹ Alternatively, you could ask residents how much they would have to be paid to do without the new park.²

The approach's simplicity is appealing, and it can be applied to virtually any issue. There are disadvantages, however. If residents have to put up money to back up their responses, they will be inclined to respond with low values, hoping that they can "free ride" on the responses of others. On the other hand, if they don't have to pay,

1. In practice, of course, it would normally make more sense to take a sample and do some math to calculate an estimate for the town as a whole.

2. In theory, asking either question should lead to the same result.

residents who want the park will undoubtedly supply high responses that don't truly reflect their preferences.³

A further disadvantage is that for some issues, such as those dealing with risk, the way questions are phrased can have a large influence on responses. Valuations that depend on slight changes in wording aren't very meaningful. As a result, if you use contingent valuation, be sure to ask the question in several different ways to make sure that you are measuring something reasonably stable.

Despite the difficulties, you may find contingent valuation useful. For example, suppose the government is considering banning a particular pesticide because a safer but more expensive alternative has been developed. It might help to survey pesticide purchasers to see whether they are willing to pay the extra cost to benefit others. If so, going forward with the ban would make sense.⁴

One of the earliest and best-known uses of contingent valuation occurred in connection with the proposed construction of a massive coal-burning generating station upwind of the Grand Canyon. Respondents were asked how much they would be willing to pay to ensure that the station was not built, since smoke from it would make the view of the canyon less impressive. Despite significant expressions of value on the part of respondents, the project went ahead.

Today clear days are few and far between at the Grand Canyon, and the quality of the viewing experience has deteriorated significantly for million of visitors each year. In hindsight, there is little doubt that the plant should have been built farther from the canyon, and that more attention should have been given to the results of the contingent valuation study.

Travel Cost Analysis

This method uses the prices of market goods to estimate the value of goods that are not traded. The approach can be illustrated by asking once again how much a park is worth, although this time it is a rural park used by nature enthusiasts. Suppose that the park now exists, but the government is considering closing it.

3. Someone is bound to respond with a value of \$2,000,000.01.

4. Of course, it may also make sense if purchasers are unwilling. In this example, using contingent valuation offers the potential advantage of making more expensive analysis unnecessary.

How It Works

Part of the value of the park is the pleasure it gives to visitors. Measuring this value will prove quite difficult, but you can get at least a minimum value by measuring the money spent to get there. Your measure of benefits might also include estimating the value of the time spent travelling to the park, using wage rates to convert travel time to dollars. In addition, you could include admission fees, equipment rentals and outfitting costs.

To estimate travel costs, you will need to collect lots of information about the park, including how many people visit, where they come from, and how they get there. Normally estimates are based on data collected in a visitor survey. Tourism departments in most jurisdictions have carried out such studies. You may find that you can extrapolate from existing research.

Don't forget that if our hypothetical park (let's call it "Park A") were closed, many visitors would go somewhere else instead (suppose all current visitors to Park A would go to "Park B" instead). Therefore, the benefit of keeping Park A open might best be estimated by calculating the cost of travelling to Park B for current visitors to Park A and then subtracting the cost of travelling to Park A. While a minimum value for the benefit of the existing park may be the cost of getting to it, you may have to think a bit about where current visitors would go if it were closed in order to estimate the benefit of keeping it open.

Obviously, the analysis can get quite complicated. Don't let the complexity discourage you too much, since the method has advantages. The travel cost approach is perhaps the strongest method considered here, since it defines a **minimum** value for the good in question that is firmly rooted in economic analysis. Whatever the true value of the experience itself, it cannot be less than what was paid to participate. Other, more indirect methods tend to produce less intuitive and more controversial results.

An Example

Extensive changes to the British Columbia Sport Fishing Regulations would reduce allowable catches and introduce shorter seasons.

The Issue: What is the cost of the proposal - that is, what benefits currently obtained would be lost due to the proposed changes?

Approach: The costs will be borne by sport fishers in the form of fewer fish to catch and less time to enjoy the fishing experience. The value of the experience might be estimated using the travel cost method.

Data Requirements: How many fishers will be affected? How far do they travel now to get to their preferred spots, and how much less travelling will they do as a result of the shorter season and smaller allowable catches?

Hedonic Pricing⁵

This approach uses the market price of a traded good to estimate the value of a public good by treating the traded good as a collection of characteristics.

How It Works

We buy most things for a number of reasons. Think of a watch as a collection of characteristics. You may have bought your watch because it provides accurate time, gives the date, has an alarm, is nice to look at, or impresses your neighbours. The value of the watch might be thought of as the total value of these and other characteristics.

What is the value of a particular characteristic of a watch? The easiest way to find out is probably by finding two watches that are identical except for the characteristic you are interested in. The value of an alarm, for example, is equal to the difference in price between the same watch with and without the alarm. To be more confident in the estimate, you might examine several pairs of watches.

By focusing on one of the characteristics of a particular traded good, it is sometimes possible to estimate the value of a public good. For example, it might prove possible to estimate the value of a bit of lakefront by comparing the price of a house located on the lake with a similar house located somewhere else.

5. The literal meaning of the term doesn't capture the method very well. We are unsure of its roots.

Of course, finding the right pair of houses will prove difficult, since they differ in so many ways. The hedonic pricing method does the matching statistically, so that you don't have to find the perfect pair. Three steps are needed:

1. The more important characteristics are identified. For houses, the following might be included: location, size, amenities, noise level, age, local school quality, property tax rate and, of course, price;
2. Lots of examples of the market good are classified using each of the characteristics identified in the previous step; and
3. A statistical procedure is used to estimate the effect of the "public good" characteristic on the price of the market good assuming that everything else is equal. In other words, to estimate the value of being on the lake-front, a statistical technique forces the houses located on and off the lake to be the same in every other way.⁶

The result of the final step can be interpreted as an estimate of the value of the public good in dollars.

The hedonic pricing method isn't used very often because it requires lots of good data to provide useful estimates: it's important to identify the right characteristics and to have lots of observations. In addition, some assumptions are needed to apply the statistical techniques. As a result, it can be quite expensive to obtain what can be uncertain results.

But the method is appealing because it is based firmly on market prices, and because it can be used to measure what may appear at first glance to be unmeasurable. With a good data set made up of houses, for example, it might prove possible to estimate things like the value of cleaner air or the benefit of noise reduction. For more expensive proposals, and perhaps only for the most expensive ones, hedonic pricing might be worth considering.

Deciding Which Approach to Use

Of the three methods considered, contingent valuation can be applied to evaluating the benefits of the widest range of non-market activities, including such apparently unmeasurable benefits as the fairness of the tax or legal systems. Recently, the

6. This isn't strictly true, but it's pretty close to the truth and hopefully gives an idea of how the method works.

approach has been used to measure how much Canadians value different medical procedures, in order to make the best use of the limited resources available for health care. As noted above, however, the accuracy of the estimates it supplies is usually open to debate.

Hedonic pricing can be usefully applied to valuing location-specific public goods. For example, the price of land or real estate can be used to examine the value we attach to such things as protection against fires, street lighting or the quality of public schools. However, the method can be very expensive to apply.

The travel cost method has been most frequently used to estimate environmental benefits. The close connection between the estimates it provides and the prices of market goods makes it an attractive option whenever people have to travel somewhere to do something they like.

Perhaps you won't find any of the methods helpful, either because they don't apply in your case or because they would be too expensive to apply. If so, you may have to rely on a description of any non-market benefits relevant to your case. Make sure that you do report unquantified, or imperfectly quantified, benefits. Just because you can't get a number doesn't mean the information isn't useful; it may prove important to ministers and to the public, and it may make the difference between approval and rejection.

Cost Effectiveness Analysis

One way to avoid estimating benefits that are difficult to quantify is to choose a target level for the program, thereby restricting the analysis to identifying the cheapest way of achieving the target. For example, a proposal might seek to reduce emissions of a particular substance by 50 per cent without trying to figure out what would be obtained in exchange. Cost effectiveness analysis takes as given the objective of the program, and focuses exclusively on costs.

This approach is clearly much easier to do than full benefit-cost analysis, but there are two very significant drawbacks:

- it remains unclear whether the benefits of the program justify the costs; and
- it is usually impossible to compare the effectiveness of the program relative to other potential programs.

You can avoid both of these shortcomings if you express costs and benefits in the same units. Doing so makes it easier to determine whether benefits will exceed costs and to compare the value of committing resources to different program areas.

Even if you can't express costs and benefits in terms of the same units, supplying some numbers for benefits will make it easier to decide whether the proposal makes sense. Simply offering a target leaves unanswered a very important question: what good things will society obtain in exchange for the costs it will bear? If there exists little evidence supporting a connection between the target and good outcomes, then it's impossible to convince others that the target is worthwhile.

If, despite its shortcomings, you decide that setting a target is the best way to go, be sure to provide a justification for the target chosen. To help choose a good target, estimate total costs for a number of different targets, plot costs against targets, and look for places where the cost per unit of target increases. A good place to set the target might be just before the cost per unit rises a lot.⁷

A Checklist

- Have you identified any non-market benefits that the proposed action would provide?
- Can you associate market goods with any of the non-market benefits you identified?
- Have any quantitative studies been done on problems similar to the one you are considering? If so, can the results of these studies be applied to your analysis?
- Would it be worthwhile to carry out some original work using any of the methods discussed?
- If you are carrying out cost effectiveness analysis, have you plotted program costs against potential targets?

7. In other words, create a graph with estimated cost on the y axis and target level on the x axis. A good place to set the target might be just before the slope increases a lot.

10 COSTS TO GOVERNMENT AND COST RECOVERY

- Three Kinds of Costs
- Estimating Costs
- Introduction to Cost Recovery

Three Kinds of Costs

As suggested in chapter 4, costs to government can be usefully broken up into three categories.

1. Administrative costs include the anticipated expenses involved in processing any forms required, as well as any other activities needed to administer the program. To help estimate costs, consider both processing time and anticipated workload.

When examining administrative costs, consider whether all of the proposed information processing is really necessary. See if you can make a distinction between information that would be somewhat desirable to have, and information that is truly needed to meet the objectives of the program. By eliminating unnecessary forms and other requirements, you can reduce costs without affecting benefits.

2. Enforcement costs include the cost of inspecting, policing, and other activities intended to ensure that any mandatory requirements are respected.

The key to estimating enforcement costs is the same as the key to estimating most other costs and benefits: compare the environment with the proposed action to the environment without it. For new programs, operating units may have to be set up. Alternatively, enforcement might have only a limited impact on the workload of existing units, perhaps because those who would have to comply are already being visited by inspectors. Where this is the case, the cost of the proposed action might be examined in terms of whether existing rules would be enforced less effectively. While it may

prove difficult to quantify these costs, don't be misled into thinking that using existing resources differently would be costless.

Sometimes it may make the most sense to rely on parties other than government for enforcement. Perhaps industry associations will be used, or consumers, or private sector testing labs. If this is the case, don't forget to include those costs when considering costs to business and/or to consumers.

3. The cost of getting into compliance. Regulations can be binding on the government as well as on private parties. Governments will sometimes have to spend money to get into compliance. For example, government laboratories might have to reduce emissions in order to comply with a proposed environmental standard. The cost of getting into compliance for government can usually be estimated in the same way as compliance costs for businesses.

When examining compliance costs for governments, don't forget to consult with the departments and agencies that would have to pay them.

Estimating Costs

If new resources would be needed for administration, for enforcement, or to bring the federal government into compliance, a Treasury Board submission is normally required. Even if new resources are not needed, TB submissions are required when introducing a cost-recovery program. For help in preparing submissions, and for more information on when they are required, see the *Treasury Board Submissions Guide*, a supplementary volume of the *Treasury Board Manual*.

There is a fair amount of overlap between the information needed for a Treasury Board submission and that required to prepare a Regulatory Impact Analysis Statement. If you have to prepare both documents, you may want to consult the *RIAS Writer's Guide*,¹ where the requirements for Treasury Board submissions are arranged in RIAS format. There's no need to repeat work you don't have to.

You may be tempted to focus on the federal government when considering costs to government. That is the right thing to do when sorting out whether a TB submission is required, but it is not the right approach when analyzing the costs and benefits of proposed actions. When examining whether or not the proposal should be implemented, your job is to act like a Canadian, not an employee of the federal

1. The *RIAS Writer's Guide*, published by Consulting and Audit Canada, Regulatory Affairs Series, Number 1, 1992. For ordering information, consult the inside front cover.

government. The key question is: do all of the benefits to Canadians justify all costs to Canadians? Consequently, you should examine all three kinds of costs for all governments in Canada.

Getting good estimates for the costs faced by governments can be tricky. For example, it can be difficult to apportion indirect and overhead costs, like the time of managers and support staff. We won't get into the details, since guidelines have already been prepared. For help in estimating all three kinds of costs to government, consult the *Guide to the Costing of Outputs in the Government of Canada*.²

Introduction to Cost Recovery

Cost recovery refers to government programs that charge user fees.

As decided by the ministers on the Treasury Board,³ it is government policy to recover costs from program beneficiaries where it is practical to do so. In general, if the beneficiaries of a program can be clearly identified, and if it would be reasonably easy to charge them, then they should pay for the service.⁴ There are exceptions, but that is the general principle upon which government policy rests.

Most cost recovery initiatives become law as regulations. As a result, the regulatory process must be followed, and the Regulatory Policy applies. Most user fee proposals must also be submitted for Treasury Board approval.

If you are considering establishing user fees, you should seek more information on when and how they should be applied, as well as on how to seek Treasury Board approval. Consult the 1992 Treasury Board Secretariat publication *Guide to User Fees*.

Since extensive cost information must be included in the TB submission to justify a cost-recovery initiative, it is rarely necessary to perform much, if any, additional analysis before writing the RIAS. As noted in the previous section, the *RIAS Writer's Guide* may prove helpful in preparing the RIAS based on the contents of the TB submission.

2. Office of the Comptroller General, Treasury Board Secretariat, 1989.

3. "External User Charges for Goods and Services, Property, Rights and Privileges," Treasury Board of Canada Decision #812553.

4. In other words, cost recovery should normally be employed whenever the good is not a "public good." For more on public goods, see the beginning of chapter 9.

For every dollar the government collects from a user fee program, somebody else pays a dollar. Financially speaking, the transaction is simply a transfer, where the direct costs (to users) exactly equal the direct benefits (to the government). To demonstrate net benefit, then, you'll have to look elsewhere.

The most obvious benefit of employing cost recovery may be that it makes things fairer or more equitable. Why should revenue collected from all taxpayers go to pay for goods or services that benefit a particular group? Depending on the details of the program, there may exist very good reasons for doing this, but on the surface it doesn't seem fair. It is difficult to put a price on fairness, of course, but this benefit should be mentioned in the RIAs where it applies.

Introducing user fees for a good or service previously supplied free of charge may also lead to efficiency gains. The best way to find out whether it is worthwhile to supply something may be to charge for it. Doing so will tend to direct money to where it is needed, and away from where it isn't. For example, charging for publications like the one you're reading may be a good way to discover what kind of information is worth providing. This may be a rather simple example, but it gets the point across: pricing things can often be used to better direct resources to where they can do the most good. Rather than spending all sorts of time and money trying to figure out how much of the good should be supplied, it might make more sense to introduce pricing and let the forces of supply and demand sort things out.

Depending on how much information you have, it might prove possible to estimate, via some fairly complicated analysis, the value of the benefit of allocating dollars more efficiently by moving to cost recovery. For all but the biggest regulations covered by this guide, however, it may not be worth the effort. You should consider whether establishing user fees would allocate resources more effectively, however. Ask yourself how efficiently resources are being allocated now, and whether things would improve if cost recovery were implemented.

For some programs, there may be arguments against (i.e., there may be costs associated with) moving to cost recovery. A particular program may, for example, provide indirect benefits that might decline if cost recovery were implemented. Consider as an example the Coast Guard's ice-breaking operations in the North, where ice-breakers supply northern communities and facilities. At present, the government does not recover the costs of these operations. While it's very easy to identify direct beneficiaries (the communities and facilities served), the program also helps establish and maintain Canada's sovereignty in the North.⁵ If implementing user fees would

5. In other words, while transportation services to northern communities may be a private good, showing the flag in the north may be a public good.

decrease the number of trips north, and if that would have an adverse impact on Canada's sovereignty, then moving to full cost recovery might not be a good idea. Since indirect benefits are obtained by all Canadians (and it would be hard to collect user fees from thirty or so million people!), the best policy might be to implement partial cost recovery.⁶

If you identify indirect benefits for a program for which cost recovery is being considered, and if these might be affected by introducing user fees, you might consider applying one of the approaches discussed in chapter 9 to estimate the value of the benefits that would be lost if cost recovery were implemented. These should be included among the costs of the cost-recovery proposal.

A Checklist

- Have you examined administrative costs, enforcement costs, and the cost of getting into compliance for all levels of government in Canada?
- Have you determined whether a Treasury Board submission is required?
- If you're analyzing a cost-recovery proposal, have you looked for indirect benefits or costs?

6. Note, however, that if there is no public good, this argument against full cost-recovery doesn't apply.



11 DISCOUNTING

- Why Discount?
- When to Discount
- How to Discount
- What Rate to Use

Why Discount?

Discounting is important because it matters not only *what* is received, but also *when* it is received.

If this seems odd, consider which you would choose to receive: ten pairs of socks today, or the same ten pairs five years in the future.¹ Now, consider which of the following regulatory alternatives you would recommend:

- Option A, which would cost \$100 million this year, and provide \$150 million in benefits next year; or
- Option B, which would cost the same \$100 million this year, but provide \$150 million in benefits 10 years down the road.

Without taking into account the influence of time, the two options would be equivalent.

Discounting is a way to account for the importance of time. Just as fractions have to be converted to a common denominator before they can be added or compared, costs or benefits from different time periods have to be discounted before they can be added or compared. To compare benefits to costs for a specific option, or to compare options to one another, you may have to discount. More specifically, if the ratio of benefits to

1. Note that it's not necessary to have figures expressed in dollars to discount them.

costs for any option changes over time, you'll have to discount your cost and benefit estimates for all options, even if all of them are expressed in the same units.

The common denominator for a benefit or a cost is its value today, known as its "present value". Before adding up the benefits (or costs) from different years, it's necessary to convert them to the same year, i.e., to calculate their present values. As a rule, the year chosen is the current year.

When to Discount

Whether or not you need to discount depends on whether the ratio of benefits to costs changes over time.² Take a look at figures 2 and 3.

In the case illustrated in figure 2, discounting isn't necessary, since the ratio of benefits to costs is constant over time. Consider a proposal that would require trains to slow down when travelling through population centres. The cost is the value of the extra time needed for travel, while the benefit is the value of the anticipated reduction in accidents. Benefits are obtained at the same time costs are incurred.

In figure 3, the ratio of benefits to costs changes over time. Consider a proposal designed to reduce pollution, where the up-front costs of installing new equipment are high, the ongoing costs are low, and the benefits of a cleaner environment aren't immediately apparent.

In cases where the ratio of benefits to costs is not constant, you'll need to discount all of your estimates before examining whether the benefits justify the costs.

2. In this and the next section, we assume that only one option is being considered. As a result, the government need only decide whether or not to implement it. The generalization to multiple options where the government must choose which option (if any) to implement is straightforward.

Figure 2
CONSTANT RATIO OF BENEFITS TO COSTS

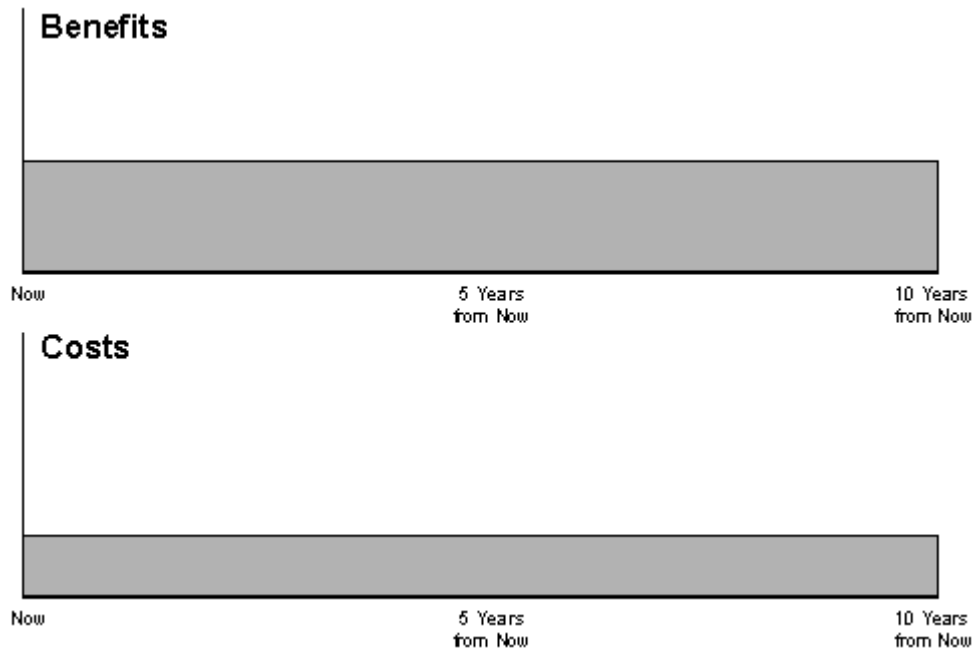
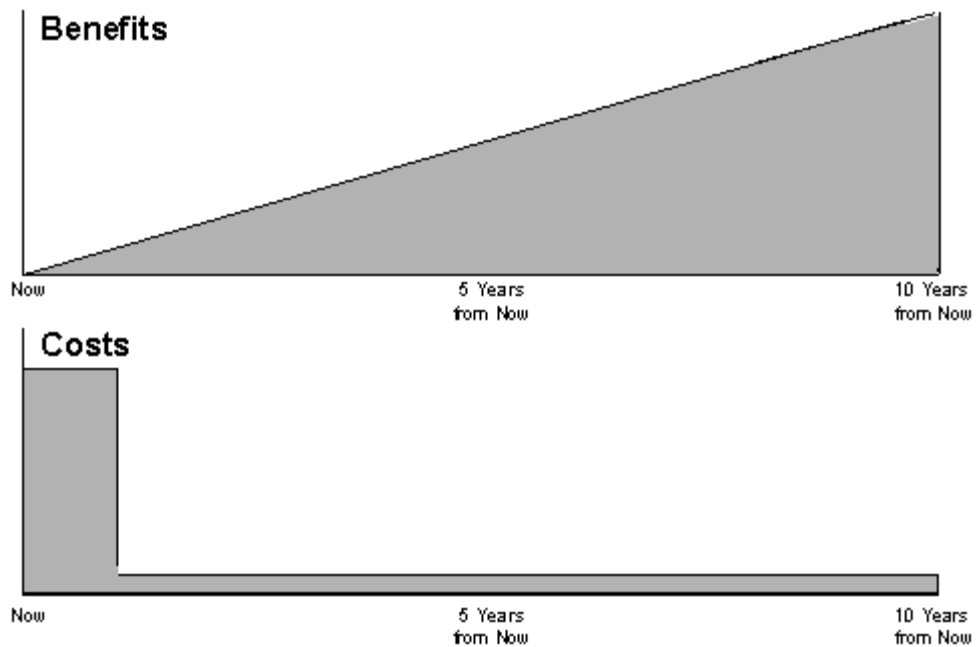


Figure 3
BENEFITS LATER, COSTS NOW



An Example

An amendment to the *Atlantic Fishery Regulations, 1985* is designed to protect declining groundfish stocks.

The Issue: The proposal would reduce the number of fish caught over the short term in order to increase the number caught over the longer term .

Approach: The costs (fish not caught) occur up-front, while the benefits (more fish caught in the future due to short-term restrictions) won't be realized for a while. It's necessary to estimate the contribution the decreased catch will make towards maintaining a larger stock in the future. Since the ratio of benefits to costs wouldn't be constant over time, you need to discount your estimates.

Data Requirements: Knowledge of the fish population and reproduction rates is needed to estimate the increase in the future population made possible as a result of short-term restrictions. You might leave your estimates in terms of the number of fish and discount them. Alternatively, if there is a relationship between the size of the catch across all fishers and the price of fish, you should probably convert your estimates for the number of fish caught to earnings measured in dollars before discounting.

How to Discount

When discounting, your goal is to calculate the total present value of benefits and costs separately so that they can be compared. It's a two-step process for both costs and benefits:

Step 1 the estimated values for each year are converted to the current year (in the following example, all estimates are converted to 1995 dollars); and

Step 2 the converted values are added.

While step 2 is simple enough, step 1 is a bit more complicated. To convert estimated values for future years to the current year, you have to multiply them by a discount factor. Explaining the discount factor requires a little algebra:

- if r represents the discount rate, and n represents the number of years in the future that the estimated value you want to discount comes from, then the discount factor is given as $1/(1+r)^n$.

For example, if r was 0.1 (10 percent), and you wanted to discount a cost estimate for the year 2005, then, in 1995, you should use a discount factor of:

$$1/(1+0.1)^{10} = 0.386$$

In short, the discount factor depends both on the discount rate and the year for which the benefit or cost is estimated.

The following example might clear up any confusion.

Let's assume that the discount rate is $r=0.1$ (we'll discuss what rate to use in the next section).

Suppose the estimated (non-discounted) benefits for a proposal that would increase the use of a national park are as follows, with all values in millions of dollars:

YEAR:	1995	1996	1997	1998	1999	2000	2001+
VALUE:	0	10	20	30	40	50	0

Step 1

To convert the values to 1995 dollars, apply the discount factor. For example, the discounted value for 1998 (rounding off to one decimal place) is:

$$30 * 1/(1+0.1)^3 = 22.5$$

The discounted benefits for the proposal are presented in the following table (note that the units are millions of 1995 dollars):

YEAR:	1995	1996	1997	1998	1999	2000	2001+
VALUE:	0	9.1	16.5	22.5	27.3	31.0	0

Step 2

The total present value of the benefits is calculated by adding the numbers in the table of discounted values:

$$0 + 9.1 + 16.5 + 22.5 + 27.3 + 31.0 = 106.4 \text{ million 1995 dollars.}$$

Suppose the (non-discounted) costs for the same proposal are as follows, with all values in millions of dollars:

YEAR:	1995	1996	1997	1998	1999	2000	2001+
VALUE:	105	10	10	5	5	0	0

Step 1

The discounted values for the costs would be, in millions of 1995 dollars:

YEAR:	1995	1996	1997	1998	1999	2000	2001+
VALUE:	105	9.1	8.3	3.8	3.4	0	0

Step 2

The total present value of the costs is calculated this way:

$$105 + 9.1 + 8.3 + 3.8 + 3.4 = 129.6 \text{ million 1995 dollars.}$$

Assuming that the only concern is whether the benefits exceed the costs (i.e., that there are no distributional issues, and that there are no non-quantified benefits or costs), then the proposal should not be implemented, since the costs (129.6 million 1995 dollars) exceed the benefits (106.4 million 1995 dollars).

To see how discounting can make a difference, calculate total costs and benefits for the same example without discounting. Since the total non-discounted benefits (\$150 million) exceed the total non-discounted costs (\$135 million), not discounting would have led to the wrong conclusion.³

3. In fact, the statement that the non-discounted benefits equal \$150 million isn't very meaningful, since numbers from different years shouldn't normally be added. The careful reader will note, however, that the annex to chapter 2 recommended that costs be summed without discounting. This simplified approach was suggested because, for $r=0.1$, the non-discounted sum over 11 years is normally fairly close to the total present value over an infinite time period.

Once you get the hang of it, calculating net present values is quite easy to do with the help of a calculator or spreadsheet program.⁴

What Rate to Use

If you want to discount, you need a discount rate. The right rate to use has been actively debated among economists for years. We'll get back to that debate, but first let's address a few common misconceptions.

The value of the discount rate does not favour benefits over costs, nor costs over benefits. Rather, the higher the discount rate, the lower the present values for both future benefits and future costs. As a result, a high rate means that the future is less important relative to the present for both benefits and costs. For a given alternative, however, the value of the discount rate will usually have an effect on the relative size of costs and benefits. Indeed, if this weren't the case, there would be little reason to discount.

The discount rate for costs and benefits is quite different from the financial discount rate used by the government to decide how to pay for projects. For costs and benefits, the social discount rate should be used. One way of conceptualizing it is as a measure of society's preference for having things now rather than in the future. This is different from the government's cost of capital used to make financial decisions. Discounting costs and benefits in terms of the social discount rate allows the analyst to reflect society's preference, which is a sensible thing for an analyst to do.

As set out in a 1976 guide,⁵ Treasury Board policy calls for using a real social discount rate of 10 percent (i.e., $r=0.1$), and for conducting sensitivity analysis using rates of 5 and 15 percent.⁶ A range is required because of theoretical and empirical uncertainty about what the "correct" rate is.

The correct social discount rate to use may depend (in theory, at least) on the initiative being assessed. For example, some economists have argued that a lower social discount rate should be applied to the analysis of initiatives with certain kinds of environmental impacts.

4. For more on how to discount, consult an introductory finance or cost-benefit text.

5. Treasury Board Secretariat, *Benefit-Cost Analysis Guide*, 1976.

6. For more on sensitivity analysis, see chapter 3. The "real" rate differs from the "nominal" rate in that the latter assumes that your estimates for future benefits and costs include the anticipated effect of inflation (i.e., the nominal rate = the real rate + the anticipated rate of inflation). Since estimates rarely (if ever) reflect anticipated inflation, you should almost always use the real rate.

However, there are some good reasons for following Treasury Board policy for all initiatives (i.e., for always using $r=0.1$, and sensitivity analysis at $r=0.05$ and 0.15):

- the issues that must be addressed to identify an initiative-specific discount rate are theoretically difficult, and it's easy to make mistakes. For example, the need to discount is sometimes confused with the need to assess difficult to identify benefits. It simply doesn't make sense to account for missing benefits by lowering the social discount rate. Rather, one should address the problem directly by searching for the missing benefits;
- even if the theory can be worked out, it's difficult to get good data to estimate what discount rates are appropriate for what kinds of initiatives; and
- using the same social discount rate all the time discourages the temptation to pick a rate in order to favour a preferred option or conclusion.

The question of whether initiative-specific discount rates can be usefully applied is probably best left to theorists and econometricians.

If we haven't successfully discouraged you from searching for the perfect rate (and we hope we have), we can at least remind you that you'll have to get approval to go against Treasury Board policy. Give us a call.⁷

Before doing that, however, examine the extent to which your results depend on the value of the discount rate. Indeed, if your recommendation regarding what (if any) option to implement is unaffected by whether you follow Treasury Board policy or use your preferred rate, there's no reason to worry about what the correct rate is.

Even if you do follow Treasury Board policy, the relative attractiveness of your options may vary significantly over the 5 to 15 percent range. If so, you might try one or more of the following:

- tighten up your analysis. Take a look at other assumptions or variables that are having an impact on your conclusions. By reducing variability elsewhere (where warranted), you might be able to eliminate the dependence of your conclusions on the value of the discount rate;
- reconsider whether one or more of the options might be improved. By increasing benefits or decreasing costs, you might become more confident in your conclusions; or

7. Regulatory Affairs, Treasury Board Secretariat at (613) 952-3459.

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- consider what rate within the 5 to 15 percent range makes the most sense. Generally speaking, however, you should place greatest weight on your results when the discount rate is 10 percent.

Don't get too hung-up on the discount rate: maybe the best way to think of the relationship between the relative attractiveness of your options and the discount rate is as one more piece of information for decision makers. Your primary objective should be to present this information clearly. When writing up your analysis, be sure to report the extent to which your results depend on the discount rate.

A Checklist

- If necessary (i.e., if the ratio of estimated benefits to estimated costs changes over time for any option), did you calculate the total present value for all quantitative benefits and costs for all options?