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Part III

Office of Management and Budget

Draft Report to Congress on the Costs and Benefits of Federal Regulations; Notice

OFFICE OF MANAGEMENT AND BUDGET

Draft Report to Congress on the Costs and Benefits of Federal Regulations

AGENCY: Office of Management and Budget, Executive Office of the President.

ACTION: Notice and request for comments.

SUMMARY: The Office of Management and Budget (OMB) requests comments on the attached draft report to Congress on the costs and benefits of Federal regulations. The draft report is divided into an introduction and four chapters. The introduction sets the context and provides the background for the next four chapters. Chapter I presents OMB's best estimate of the total costs and benefits of Federal regulatory programs and discusses several retrospective studies of specific regulatory programs to gain insight on how actual costs and benefits of regulations may differ from the effects predicted prior to regulation. Chapter II provides data on the costs and benefits of each of the economically significant regulations reviewed by OMB under Executive Order 12866 in the last year. Chapter III provides additional data on the costs and benefits of the economically significant regulations reviewed by OMB from April 1, 1995 through March 31, 1998. Chapter IV discusses how OMB implemented last year's recommendations and presents the Administration's proposal to restructure and deregulate the electricity sector.

DATES: To ensure consideration of comments as OMB prepares this draft report for submission to Congress on or before September 30, 1998, comments must be in writing and received by OMB no later than September 16, 1998.

ADDRESSES: Comments on this draft report should be addressed to John F. Morrall III, Office of Information and Regulatory Affairs, Office of Management and Budget, NEOB, Room 10235, 725 17th Street, NW., Washington, DC 20503.

Comments may also be submitted by facsimile to (202) 395–6974, or by electronic mail to MORRALL_J@A1.EOP.GOV. (Please note that the ''l'' in ''A1'' is the number one and not the letter ''l''.) Be sure to include your name and complete postal mailing address in the comments sent by electronic mail. If you submit comments by facsimile or electronic mail, please do not submit them by regular mail also.

Electronic availability and addresses: This **Federal Register** notice is available electronically from the OMB homepage on the World Wide Web: http://www.whitehouse.gov/WH/EOP/OMB/html/fedreg.html.

FOR FURTHER INFORMATION CONTACT: John F. Morrall III, Office of Information and Regulatory Affairs, Office of Management and Budget, NEOB, Room 10235, 725 17th Street, NW., Washington, DC 20503. Telephone: (202) 395–7316.

SUPPLEMENTARY INFORMATION: Congress directed OMB to prepare a report to Congress on the costs and benefits of Federal regulations. Specifically, under section 625 of the Treasury and Government Appropriations Act, 1998 (Pub. L. 105–61), the Director of OMB is to submit to Congress, no later than September 30, 1998, a report that, in summary, provides (1) estimates of the total annual costs and benefits of Federal regulatory programs, (2) estimates of the costs and benefits of each rule that is likely to have a gross annual effect on the economy of $100,000,000 or more in increased costs, (3) an assessment of the direct and indirect impacts of Federal rules, and (4) recommendations from OMB and a description of significant public comments to reform or eliminate any Federal regulatory program that is inefficient, ineffective, or is not a sound use of the Nation's resources.

The attached document is a draft of this report to Congress. OMB is to provide public notice and an opportunity to comment on the report before it is submitted to Congress no later than September 30, 1998.

Issues for Comment

Accordingly, OMB seeks comment on all aspects of the attached draft report, particularly comments and suggestions pertaining to the following:

- The validity and reliability of our new estimates of the costs and benefits of regulations in the aggregate, as well as by regulatory program or program element;
- Our discussion of the methodological problems of estimating the costs and benefits of existing rules, e.g., the baseline and comparability problems and complications introduced by using prospective studies to evaluate existing programs; and difficulties reconciling quantitative and qualitative estimates of costs and benefits;
- Our review of several case studies of the costs and benefits of existing regulations and the lessons we draw from them;
- Any additional studies that might provide reliable estimates or assessments of the annual costs and benefits, or direct and indirect effects on the private sector, State and local government, and the Federal Government, of regulation in the aggregate or of the individual regulations that we discuss;
- Our approach to estimating the costs and benefits of the individual regulations issued between April 1, 1995, and March 31, 1998, that we discuss, and;
- Programs or program elements on which there is objective and verifiable information that would lead to a conclusion that such programs are inefficient or ineffective and should be eliminated or reformed.

Bruce McConnell,

Acting Administrator, Office of Information and Regulatory Affairs.

Draft Report to Congress on the Costs and Benefits of Federal Regulations

Introduction

The Office of Management and Budget issued its first report to Congress on the costs and benefits of Federal regulations on September 30, 1997. Section 625 of the Treasury and Government Appropriations Act, 1998 (P.L. 105–61) directs OMB to issue a second regulatory accounting report. The requirements of the report are the same as those of last year. Section 625(a) directs the Director of the Office of Management and Budget to submit to Congress, no later than September 30, 1998, a report that provides:

> ''(1) Estimates of the total annual costs and benefits of Federal regulatory programs, including quantitative and non-quantitative measures of regulatory costs and benefits;
>
> ''(2) Estimates of the costs and benefits (including quantitative and non-quantitative measures) of each rule that is likely to have a gross annual effect on the economy of $100,000,000 or more in increased costs;
>
> ''(3) An assessment of the direct and indirect impacts of Federal rules on the private sector, State and local government, and the Federal Government; and
>
> ''(4) Recommendations from the Director and a description of significant public comments to reform or eliminate any Federal regulatory program or program element that is inefficient, ineffective, or is not a sound use of the Nation's resources.''

In last year's report we indicated that a complete accounting of total costs and benefits of Federal regulation was a difficult undertaking. The 1997 report was our effort to begin an incremental process which we believe will lead to improved information on the effects of regulations, and will help solve the many methodological problems associated with this exercise. This year's report builds on last year's work. In particular, we have additional data to

supplement our discussion of the aggregate costs and benefits of regulation and expand our database of costs and benefits of individual, major rules from one year (1997) to three years (1996 to 1998). In addition, we have more experience in dealing with the methodological problems.

One fact has not changed since the first report. There are still enormous data gaps in the information available on regulatory benefits and costs. Although accurate data is still sparse and agreed-upon methods for estimating many effects are still lacking, we have made significant progress in improving these estimates, especially for the major rules of the last three years. As we stated last year, explicitly quantifying and monetizing benefits and costs significantly enhances our ability to compare alternative approaches to achieving regulatory goals, ultimately producing more benefits with fewer costs. President Clinton's Executive Order 12866, ''Regulatory Planning and Review,'' recognizes and incorporates this principle, requiring agencies to quantify both costs and benefits to the best of their ability and to the extent permitted by law. We continue to recognize that significant regulatory costs and benefits may not be quantifiable, but may have to be described in qualitative terms. All information, both qualitative and quantitative, contributes to our understanding of the effects of regulation.

This year's report presents new information on both the total costs and benefits of regulation and the costs and benefits of major individual regulations. We hope to continue this important dialogue to improve our knowledge about the effects of regulation on the public, the economy, and American society.

This document is a draft of our report. Section 625(b) requires the Director of OMB to provide public notice and an opportunity to comment on the report before it is submitted to Congress at the end of September 1998. Furthermore, the final report is to contain a description of significant public comments. Accordingly, we seek comments on all aspects of this document, but in particular are interested in comments and suggestions pertaining to the following:

- The validity and reliability of our new estimates of the costs and benefits of regulations in the aggregate, as well as by regulatory program or program element;
- Our discussion of the methodological problems of estimating the costs and benefits of existing rules, e.g., the baseline and comparability problems and complications introduced by using prospective studies to evaluate existing programs;
- Our review of several case studies of the costs and benefits of existing regulations and the lessons we draw from them;
- Any additional studies that might provide reliable estimates or assessments of the annual costs and benefits, or direct and indirect effects on the private sector, State and local government, and the Federal Government, of regulation in the aggregate or of the individual regulations that we discuss;
- Our approach to estimating the costs and benefits of the individual regulations issued between April 1, 1995, and March 31, 1998, that we discuss; and
- Programs or program elements on which there is objective and verifiable information that would lead to a conclusion that such programs are inefficient or ineffective and should be eliminated or reformed.

All comments received will be carefully considered in preparing the final report that will be submitted to Congress.

The draft report is divided into four chapters. In accordance with section 625(a)(1), chapter I presents our best estimate of the total costs and benefits of Federal regulation. It builds on chapter II of last year's report presenting updated and more detailed estimates of the total annual costs and benefits of major Federal regulatory programs.[1] In particular, this year we present more categories of regulatory costs and benefits than last year and use our own estimates based on agency data of costs and benefits of individual rules issued over the last three years (April 1, 1995 to March 31, 1998) to update the aggregate estimates. We also chose this year to provide ranges of costs and benefits rather than point estimates to emphasize the uncertainty embodied in the estimates.

As we did last year, we use the study by Hahn and Hird (1991) for the costs and benefits of regulations as of 1988, supplemented by an Environmental Protection Agency (EPA) Cost of a Clean Environment report to Congress (1990). We also use a new (1997) retrospective EPA report to Congress (The Benefits and Costs of the Clean Air Act, 1970 to 1990). Because there are no studies comparable to the Hahn and Hird or the EPA retrospective studies for the regulations issued after 1988,[2] we use information about costs and benefits from agency prospective regulatory impact analyses (RIAs) to account for the major regulations that have been issued since 1988. In almost all cases, the RIAs have been subject to notice and comment and have been reviewed by OMB. This year we have systematically started to improve the consistency of the agency estimates and to show monetized estimates of benefits where appropriate and feasible. We have completed this analysis for the last three years and plan to complete additional years in the future.

The new estimates range from $170 billion to $224 billion in annual costs and $258 billion to about $3.55 trillion in annual benefits for social, i.e., health, safety, and environmental regulation. Using the ranges to reflect the substantial uncertainty in the estimates, quantified (and monetized) net benefits could be as low as $34 billion, or as high as $3.38 trillion. The main reason why these estimates are different from last year, especially on the upper end of the range of benefits, is that we have incorporated retrospective estimates from a recent EPA report on the benefits and costs of the Clean Air Act. This report, discussed in detail in chapter I, estimates the benefits of the Clean Air Act at up to $3.2 trillion. Three new regulations also included in the estimates (EPA's revised particulate matter and ozone primary National Ambient Air Quality Standards and OSHA's respirator rule) are estimated (using midpoints) to provide approximately $35 billion in benefits per year. While this information is useful, we still believe that the limitations of these estimates for use in making recommendations about reforming or eliminating regulatory programs are severe. Aggregate estimates of the costs and benefits of regulation offer little guidance on how to improve the efficiency, effectiveness, or soundness of the existing body of regulations.

Chapter I also discusses the impacts of other types of regulation and regulatory-like activities and reviews several estimates of the aggregate costs of regulation as well as several retrospective case studies. Estimates of

[1] Chapter I of last year's report discussed the role of economic analysis in regulatory reform. We discussed the growth and nature of regulation, the development of the U.S. regulatory analysis and review program and the basic principles that should be used in assessing regulatory costs and benefits. We did not repeat that discussion this year but it is still useful for understanding the context of this year's report. (See OMB 1997 or http://www.whitehouse.gov/WH/EOP/OMB/html/rcongress.htm).

[2] EPA's Clean Air Act report covers effects through 1990. However, for the annual estimates that appear in table 1 and in the text, we have, in consultation with EPA staff, adjusted EPA's estimates to reflect only effects as of 1988.

the impacts of economic efficiency losses, disclosure regulation, economic transfers, tax compliance costs, Federal on-budget regulatory expenditures, and the possible indirect effects of regulation on the economy as directed by section 625(a)(3) are also presented and discussed.

In fulfillment of section 625(a)(2), chapter II provides data from the agencies on the costs and benefits of each of the economically significant regulations reviewed by OMB under Executive Order 12866 over the period from April 1, 1997, to March 31, 1998. The data were developed by the agencies as required by the Executive order. For the most part, these data were subject to notice and public comment and reviewed by OMB. We also examined the reports on major rules that GAO provides to Congress for the independent agencies not subject to Executive Order 12866; however, these generally were not of sufficient detail or quality to provide much useful information for the purposes of this report. Finally, this chapter also highlights examples where agencies have done a particularly exemplary job of following the guidance in the Best Practices [3] document, which is on our web site at http://www.whitehouse.gov/WH/EOP/OMB/html/miscdoc/riaguide.html.

Chapter III provides estimates of the costs and benefits for the economically significant/major rules issued between April 1, 1995 and March 31, 1998, for which we were able to estimate costs and benefits. The estimates that we present in chapter III for regulations issued during these three years are either straightforward agency estimates, or estimates that we calculated using a consistent methodology and value estimates used by the agencies for other regulations or in some cases found in the academic literature. We estimate annual costs of major rules for these three years to be about $28 billion while annual benefits range from $30 to $97 billion.

Chapter IV discusses how we implemented last year's recommendations aimed at further developing the information, methodologies, and analyses necessary for improving the efficiency, effectiveness, and soundness of regulatory programs and program elements as required by section 625(a)(4). We discuss how the agencies and OMB worked together to improve the quality of the data and analysis found in the economic impact studies submitted to OMB under Executive Order 12866, and in particular how we promoted the use of the Best Practices guidance document. Finally, also in fulfillment of section 625(a) (4), we present a discussion of the Administration's proposal to restructure and deregulate the electricity sector.

Chapter I: Estimating the Total Annual Costs and Benefits of Federal Regulatory Programs

A. Overview

By using new data from agency regulatory impact analyses that accompany regulations, this chapter builds on chapter II of last year's report (OMB 1997) to present updated and more detailed estimates of the total annual costs and benefits of Federal regulatory programs. We also discuss and present quantitative estimates where available of indirect impacts and other effects of regulation and related Government policies. Finally, several retrospective studies of specific regulatory programs are reviewed to gain insight on how the actual costs and benefits of regulations may differ from the effects predicted prior to regulation.

We respond to the comments we received on last year's report in several ways. First, we present more details by regulatory program and build on agency analyses to monetize benefits estimates. Second, we review the analyses from independent agencies and present more systematic data on the costs and benefits of economic regulation, tax compliance costs, transfers, Federal regulatory expenditures, and indirect impacts. Finally, our review of several important retrospective studies responds to important methodological issues raised regarding the use of prospective studies to estimate the costs and benefits of existing regulations.

1. Estimation Problems

Before proceeding with our new estimates, we reiterate and reemphasize the methodological concerns and caveats that were discussed in last year's report. These concerns remain of critical importance. It remains extremely difficult, if not impossible, to estimate the actual total costs and benefits of all existing Federal regulations with any degree of precision. There is a variety of estimation problems for both individual estimates and aggregate estimates.

In order to estimate the impact of regulations on society and the economy, one has to determine how things would have been if the regulation had not been issued. In other words, what is the baseline against which costs and benefits should be measured? With respect to estimating total costs and benefits of all Federal regulations, the baseline problem has several dimensions. First, what would have happened in the absence of regulation can only be an educated guess since it never happened. Furthermore, the greater the regulatory change, the more problematic the exercise. For example, the assumptions of welfare economics, upon which benefit-cost analysis is based, hold only for marginal changes in economic activities. The larger the changes, the less sure we are of the predictions. In other words, we can be more confident in our estimates of the costs and benefits of a small change in the level of automobile emissions permitted than in the costs and benefits of all Clean Air Act regulations and still more confident than in estimates of the costs and benefits of all regulations issued by the Federal Government since the early 1900s. If we use as a baseline a world with no regulation, one can reasonably argue that the benefits of regulation must clearly swamp any likely cost.

Even disregarding the problem of modeling large changes, there are significant difficulties in determining the counterfactual or baseline for individual regulations that one could begin to aggregate. One can survey firms and other regulated entities on their expected compliance costs either prospectively, before the regulation is implemented, or retrospectively, after the regulation has gone into effect. For both types of studies, the problem of potential estimation bias must be kept in mind since regulators and regulatees may have different interests in the outcomes. The problem of bias is potentially greater for prospective studies because both the baseline and the regulatory effects must be predicted while for retrospective studies only the baseline or counterfactual must be predicted. In the ordinary course, therefore, the best estimates of the costs and benefits of regulation are likely to be retrospective studies done by individuals who do not have vested interests, but do have reputations as objective analysts to uphold.

To make matters even more complicated, a third type of study is actually needed before recommendations can be made to eliminate or modify regulatory programs. That is a hybrid study

[3] OMB published in 1996 a document that describes ''Best Practices'' for preparing the economic analysis called for by Executive Order 12866 for significant regulatory actions. This document represents the culmination of a two-year effort by an interagency group to review the state of the art for economic analyses required by the Executive order.

somewhere between pure prospective and pure retrospective. The ideal hybrid study would be a retrospective study of the existing regulation with prospectively estimated costs and benefits of eliminating or modifying it. A hybrid study is needed because ''sunk costs,'' such as specialized capital costs and the cost of changing procedures already in place, make the cost savings from eliminating regulation less than the cost of complying with those regulations. Furthermore, on the benefit side there appears to exist an asymmetry between giving someone a benefit and taking it away. Studies have shown that people are willing to pay less for a benefit than what they are willing to accept in return for its loss. In other words, once people have attained safer jobs or cars, or cleaner air or water, they appear willing to pay more for keeping such benefits than they were willing to pay to attain them. Very few studies of health, safety, and environmental regulation have attempted to estimate the actual cost savings and benefit losses that would result from reducing or eliminating an existing regulation.[4]

Further, virtually all of the studies of the costs of regulation produced to date measure the expenditures of firms required by regulation, whereas the cost to society of regulation should be measured by the change in consumer and producer ''surplus'' associated with the regulation and with any price and/or income changes that may result (Cropper and Oates 1992). At one extreme, ignoring the consumer surplus loss produced by a ban on the sale of a product understates costs to society because although no compliance expenditures are required, consumers can no longer buy the product. At the other extreme, calculating compliance expenditures based on pre-regulation output overstates costs because if the firm raises prices to cover compliance costs, consumers will shift to other products and thereby reduce their welfare losses (Cropper and Oats 1992, p. 722).

Another problem is the fact that many studies that we rely on for cost and benefit estimates are dated. Over time the dynamic nature of the economy may affect the estimation of both benefits and costs. Technological improvements are often cited as the reason that predicted costs of compliance often turn out to be less than actual costs (Office of Technology Assessment 1995). Less well noted, however, is that technological progress also takes place on the benefit side. For example, medical progress can reduce the future benefits estimated for health, safety and environmental regulations, just as productivity improvements in manufacturing reduce the costs of compliance of some regulations. New drugs or medical procedures can reduce the benefits of regulations aimed at reducing exposure to certain harmful agents such as an infectious disease. Regulations aimed at increasing the energy efficiency of consumer products or buildings may see their expected benefits reduced by new technology that reduces the cost of producing energy. Furthermore, productivity improvements lead directly to higher incomes, which lead people to demand better health and more safety. Business responds to these demands by providing safer products and workplaces, even in the absence of regulation. Individuals with rising incomes may also purchase or donate land to nature conservancies to provide ecological benefits. Yet, as on the cost side, the baseline that is used is almost always the *status quo*, rather than what is likely to be true in the future.

It is often difficult to attribute changes in behavior to specific Federal regulations apart from the many other motivating factors. In addition to overlapping Federal regulations, often from different agencies, e.g., environmental issues may be regulated by the Environmental Protection Agency (EPA), the Department of Agriculture (USDA), the Department of Energy (DOE), the Department of the Interior (DOI), the Department of Commerce (DOC) and the Department of Transportation (DOT), state and local regulations also require compliance. The tort system, voluntary standards organizations, and public pressure also cause firms to provide a certain degree of public protection in the absence of Federal regulation. As the General Accounting Office (GAO) points out, determining how much of the costs and benefits of these activities to attribute solely to Federal regulation is a difficult undertaking (GAO 1996).

Adding to the complexity, the degree to which these other factors cause firms and other regulated entities to provide safe and healthful products and workplaces and engage in environmentally sound practices changes over time, generally increasing with increasing *per capita* incomes and knowledge about cause and effect. Thus, although the National Highway Traffic Safety Administration (NHTSA) has significantly increased the safety of automobiles, it is not likely that if the agency's regulations were eliminated the automobile companies would discontinue all the safety features that have been mandated. Consumers are demanding safer cars and automobile companies are concerned about product liability. This same phenomenon is taking place in the environmental area. Environmentally responsible behavior is good for the bottom line. Over time, this ''rising baseline'' phenomenon, if correct, should reduce the true costs and benefits of health, safety, and environmental regulations. Estimates of the aggregate costs and benefits of regulation that include unadjusted estimates from aging studies are thus likely to overestimate the current costs and benefits of those regulations.

Yet another problem may be termed the ''apples and oranges problem.'' The attempts to aggregate the total costs and benefits of Federal regulations have simply added together a diverse set of individual studies. Unfortunately, these individual studies vary in quality, methodology, and type of regulatory costs included. In addition to using different assumptions about baselines and time periods problems discussed above, the studies use different discount rates, different valuations for the same attribute, and different concepts of costs and approaches to dealing with uncertainty, to mention a few. Furthermore, the possibility of interaction effects between the tens of thousands of regulations is not addressed.

A final reason that any regulatory accounting effort has limits is the lack of information on the effects of regulations on distribution or equity. None of the analyses addressed in this report provides quantitative information on the distribution of benefits or costs by income category, geographic region, or any other equity-related factor. As a result, there is no basis for quantifying distributional or equity impacts.

2. Types of Regulation

Because there are so many different types of Federal regulations, it is useful to break this heterogeneous body up into categories. As we did last year we describe five commonly used categories.

Environmental. The true social cost of regulations aimed at improving the quality of the environment is represented by the total value that society places on the goods and services foregone as a result of resources being diverted to environmental protection.

[4] Note that the problem of bias may be the greatest in this case because often both the regulators and the regulatees will prefer the status quo, i.e., regulation. This appears to be the lesson from the Occupational Health and Safety Administration's (OSHA) reconsideration of the cotton dust standard during the Reagan Administration. After opposing the regulation at the proposal stage during the Carter Administration, the industry did not support the Reagan Administration's proposal to withdraw it. (See Viscusi 1992).

(EPA's Cost of a Clean Environment, pp. 1–2, 1–3.) These social costs include the direct compliance costs of the capital equipment and labor needed to meet the standard, as well as the more indirect consumer and producer surplus losses from lost or delayed consumption and production opportunities due to the higher prices and reduced output needed to pay for the direct compliance costs. In the case of a product ban or prohibitive compliance costs, almost all of the costs represent consumer and producer surplus losses. Most of the cost estimates used in this report do not include consumer and producer surplus losses because it is difficult and often impractical to estimate the demand and supply curves needed to do this type of analysis.

Further indirect effects on productivity and efficiency result from price and output changes that spread through other sectors of the economy. Estimates of compliance costs likely understate substantially the true long-term costs of pollution control.[5] The estimates used in this report do not include these indirect and general equilibrium effects.

The benefits of environmental protection are represented by the value that society places on improved health, recreational opportunities, quality of life, visibility, preservation of ecosystems, biodiversity, and other attributes of protecting or enhancing our environment. This value is best measured by society's willingness-to-pay (WTP) for these attributes. Because most types of improvement in environmental quality are not traded in markets, benefits must be estimated by indirect means using sophisticated statistical techniques or ''contingent valuation'' survey methods that generally make benefit estimation more problematic than cost estimation.

Other Social. This category of regulation includes rules designed to advance the health and safety of consumers and workers, as well as regulations aimed at promoting social goals such as equal opportunity, equal access to facilities, and protection from fraud and deception. They are often lumped together with environmental regulation in the category of ''Social Regulation.'' Social regulation is mainly concerned with controlling or reducing the harmful or unintended consequences of market transactions, such as air pollution, occupationally induced illness, or automobile accidents. These consequences are commonly called ''negative externalities'' and regulation designed to deal with them attempts to ''internalize'' the externalities. This can be done by regulating the amount of the externality, e.g., banning a pollutant or limiting it to a ''safe'' level, or regulating how a product is produced or used. Social regulation may also require the disclosure of information about a product, service, or manufacturing process where access to inadequate or asymmetric information may place consumers, citizens, or workers at a disadvantage. The techniques and methodological concerns involved in the estimation of the social costs and benefits generated by these rules are similar to those involved in the estimation of costs and benefits of environmental regulation discussed above. In the results that we report below, we further break ''Other Social'' into three categories: transportation, labor and other regulations. The third category includes food and drug safety, energy efficiency, and quality of medical care regulations.

Economic. Economic regulation restricts firms' primary economic activities, e.g., their pricing and output decisions. It may also limit the entry or exit of firms into or out of certain specific types of businesses. Such regulations are usually applied on an industry wide basis, e.g., agriculture, trucking, or communications. In the United States, this type of regulation at the Federal level has often been administered by ''independent'' commissions, e.g., the Federal Communications Commission (FCC), the Securities and Exchange Commission (SEC), or the Federal Energy Regulatory Commission (FERC), whose members are appointed but not removable without good cause by the President. The economic losses caused by this type of regulation result from the higher prices and inefficient operations that often occur when competition is prevented from developing.

The costs of such regulation are usually measured by modeling or comparing specific regulated sectors with less regulated sectors, estimating the consumer and producer surplus losses that result from higher prices and lack of service, and estimating the excess costs that may result from the lack of competition. In contrast to social regulatory cost estimates, these are estimates of mainly indirect costs.

Economic regulation may produce social benefits when natural monopolies are regulated to simulate competition. Although Hahn and Hird (1991) argue that the dollar amount of such efficiency benefits are small in a dynamic and technologically vibrant economy, their judgment is an educated guess based on a reading of recent history, rather than the result of an empirical study. It appears to be based largely on the widely accepted view that the U.S. economy has become more competitive over time, with fewer long-lasting natural monopolies, and on the observation that much of the motivation for economic regulation is to enhance one group at the expense of another. But even though monopoly power may not be long lasting in a dynamic U.S. economy, it does exist at a given point in time.[6]

Moreover, while Hahn and Hird (1991) define economic regulation as including only regulation of entry, output, and prices, in practice they appear to lump all Federal regulation of banking and other financial institutions, as well as consumer protection regulation through mandated disclosure requirements, into the ''economic regulation'' category of their cost estimates. In our view, chartering, branching, interest rate, and activity regulation are the only major categories of banking regulation that conform to the definition of economic regulation used here. The other categories are ''safety-and-soundness'' regulation and ''consumer information and protection'' regulation, both of which fit more logically into the ''other social regulations'' category used in this study (White 1991, pp. 32–33). Consideration of this definitional issue is important because the type and magnitude of benefits associated with the different categories of banking regulation differ greatly. In particular, while costs may exceed benefits for some types of economic regulation (entry, output, and prices), safety-and-soundness regulation is essential to a well functioning financial system and thus fully justifies the cost (White 1991), and the consumer protection regulation applicable to banking is similar to consumer protection information for other industries where there is general agreement that the benefits exceed the costs.

Transfer. As discussed in OMB's Best Practices document, transfers are payments from one group in society to another and, therefore, are not real net costs to society as a whole. Nonetheless, the consequences for individuals can be very significant. One person's loss is another person's gain. Examples of transfers include payments to Social

[5] See Jaffe, Peterson, Portney, and Stavins' survey (1995), p. 153.

[6] We are not including antitrust activities such as preventing the formation of monopolies through mergers or anticompetitive behavior in our definition of economic regulation. Clearly this type of Government policy creates important social benefits.

Security recipients from taxpayers and the higher profits that farmers receive as a result of the higher prices consumers must pay for farm products limited by production quotas. Our guidance document states that transfers should not be added to the cost and benefit totals included in regulatory assessments but should be discussed and noted for policy makers.

Process. Process costs are the administrative or paperwork costs of filling out Government forms such as income tax, immigration, social security, procurement, etc. The majority of process costs is due to program administration, Government procurement, and tax compliance, which do not fall into either the social or economic regulatory categories. Some of these, such as procurement costs, are reflected in the Federal budget as greater fiscal expenditures and care must be taken not to count them twice. Process costs can be viewed as part of the costs of providing Government services or collecting revenues that should be minimized for a given level or quality of service or revenue. We break these types of costs into further categories and discuss their effects in more detail below.

B. New Estimate of the Costs and Benefits of Existing Social Regulations

Several commentators on last year's report called for more detail on the costs and benefits of regulatory programs. It is important to note that, as was the case last year, this section includes only estimates of costs and benefits that have been quantified and monetized. As we discuss elsewhere in this report, the fact that an effect has not been monetized or quantified does not necessarily mean that it is small or unimportant.

Last year we broke out costs and benefits of existing social regulations into two categories: environmental and other social (OMB 1997, table 1). This year we have been able to further subdivide other social into three categories: labor, transportation, and other social regulation, mainly regulations from HHS, DOE, and USDA. We were able to do this by further utilization of the results of the 1991 article by Hahn and Hird and the 1996 book by Hahn as well as the Cost of a Clean Environment report (EPA 1990), and by making new estimates of the costs and benefits of regulations issued over the last three years (April 1, 1995 to March 31, 1998), which we derive in chapter III using data from the Regulatory Impact Analyses submitted by the agencies to OMB under E.O. 12866. We have also incorporated EPA's recently published report, The Benefits and Costs of the Clean Air Act, 1970–1990 (EPA 1997), hereafter referred to as the ''Section 812 Retrospective.'' In addition, we examined data submitted to GAO by the independent agencies over the last two years under the Congressional Review Act for major rules. In order to estimate aggregate regulatory costs and benefits, we combine three data sources covering three time periods—pre-1988, 1988 to 1994, and 1995 to 1998.

Since Hahn and Hird provide cost and benefit estimates for more than two categories of social regulations, we were able to expand our estimate detail from two categories last year to four this year. We were limited to four categories because the cost data we relied upon to fill the gap between the 1988 Hahn and Hird data and our cost and benefit estimates starting in 1995, (from the 1996 OMB report, More Benefits, Fewer Burdens) contain only the four categories listed above. We also use additional information on the distribution of benefits that we did not use last year. Last year we used Hahn and Hird's conclusion that ''the net benefits of social regulation are positive but small'' (p. 253) to estimate that the costs and benefits of both environmental and other social regulations were approximately equal. They came to this conclusion by taking the midpoint of their ranges for costs and benefits. However, as we pointed out last year, there is much uncertainty associated with these estimates. Moreover, we were criticized for presenting point estimates when ranges would have been more appropriate (Hahn 1998). This year we have elected to present ranges both for the base case and later for our estimates of the costs and benefits of the regulations that have been issued since the base period. Table 1 shows these cost and benefit estimates derived from Hahn and Hird for the four regulatory program areas as of 1988.[7] Table 1 also includes new estimates from the Section 812 Retrospective.[8]

The addition of the Section 812 Retrospective significantly changes the upper bound benefit estimate for environmental regulation, i.e., more than 15 times the upper bound of the Hahn and Hird study. As we outlined at the beginning of this chapter, there are a number of critical estimation problems that must be confronted in developing benefit and cost estimates. The available studies, such as the Hahn and Hird study and the Section 812 Retrospective, also have had to confront these problems and each study has had to make difficult choices. As a result, there are advantages and disadvantages that attend each of these studies. The EPA estimates of $378 million to $3.2 trillion per year are substantially larger than the estimates presented by Hahn and Hird. The Hahn and Hird estimates were based on a 1982 study by Freeman that provided a synthesis of the available benefits literature. These estimates do not reflect the benefits associated with Clean Air Act initiatives in the 1980s, e.g., EPA's lead phasedown program. They also do not reflect the recent literature suggesting an association between exposure to fine particulate matter and premature mortality. In addition, the 1982 Freeman estimates were based on actual air quality improvements over the 1970s, i.e., they did not attempt to account for the benefits associated with preventing degradation in air quality.

The Section 812 Retrospective estimates were developed through an EPA Science Advisory Board peer review process. It presents a more comprehensive set of the benefits and costs under the Clean Air Act over the period from 1970 to 1990; for example, it includes regulatory actions taken during the 1980s. In addition, these estimates also include the benefits and costs of preventing any deterioration in air quality and reflect the benefits and costs of all air pollution control efforts, not just the Federal Clean Air Act. Our detailed discussion in section D below presents a more complete description of the Section 812 Retrospective and identifies some key uncertainties and assumptions underlying the benefit estimates that may have an important effect on the magnitude of these estimates.

To get the costs of existing regulations as of 1997, last year's report added to the 1988 base the costs of the major regulations reviewed by OMB between 1987 and 1996 as estimated from the RIAs agencies provided OMB under Executive Order 12866 and its predecessor Executive Order 12291 (OMB 1996). To estimate benefits, last year we used benefit/cost ratios for environmental and other social regulation calculated from Hahn (1996), who estimated benefits and costs of

[7] We do not repeat the discussion of the derivation and the qualifications of these estimates that appeared in last year's report. We refer the reader to that discussion (OMB 1997 pp. 27–33) for this information. Suffice it to say here that we realize, as several commenters have pointed out, that there are gaps and weaknesses in underlying studies that Hahn and Hird rely on for their estimates and that not all the costs and benefits of social regulation are captured in these estimates. We hope in future years to fill in the gaps and use more accurate, up-to-date studies for our estimates when such studies become available.

[8] Table 1 (and all succeeding tables mentioned in the text) can be found in sequential order at the end of this report.

agency rules from 1990 to mid-1995, for a subset of our rules, to estimate benefits that correspond to our rules. We then added that total to the benefit estimate as of 1988 from Hahn and Hird. This year we improve on that exercise by using benefit/cost ratios from Hahn (1996) for environmental, transportation, labor, and other social regulation to estimate benefits for rules issued between 1987 and 1995.[9] For the rules issued from 1995 through the first quarter of 1998, we used information from agency-supplied RIAs modified for consistency with Best Practices as appropriate and extended to provide more monetized estimates of benefits and costs using consensus value estimates used by the agencies or found in the literature. These calculations are shown and explained in chapter III. Our latest estimates are shown in table 2.

Table 3 combines the results from tables 1 and 2 to present our new estimates for the existing costs of social regulation as of the first quarter in 1998. It shows that health, safety and environmental regulation produces between $34 and $3.38 trillion of net benefits per year.

We must underline the uncertainty of these estimates. They are useful primarily for drawing general conclusions about categories of regulations that should be corroborated by additional data and analysis. As specific values, however, they are fraught with uncertainties. As discussed above, the baseline, apples and oranges, and other methodological problems significantly reduce the likelihood that these findings are robust. In addition to these problems, we are also concerned that as the aggregate categories are divided into smaller parts, the accuracy of the estimates may weaken because it is less likely that randomly distributed errors in the data and analysis even out. Furthermore, one must be doubly careful about drawing conclusions from these results because these estimates are average benefits and costs for aggregates of existing regulations, not the incremental costs and benefits that are required to be able to make reliable recommendations to improve specific regulatory programs or regulations. Also note that these estimates are a combination of the 1988 baseline estimates, which are mostly from retrospective studies, and the 1988 to 1998 estimates that are from the prospective studies for individual rules. How well the cost and benefit estimates of prospective studies predict actual costs and benefits is a question that has not been answered. In section D of this chapter, we review the evidence from several case studies that might shed light on this question. Where we can make direct comparisons between prospective and retrospective analyses, we find that both costs and benefits were sometimes overestimated by prospective studies. In other instances, costs were underestimated.

Finally regarding the utility of these estimates for making recommendations for changes in regulatory programs, it bears repeating that the actual costs and benefits of a regulation or regulatory program are not the appropriate calculation. Rather, before a recommendation is made to repeal or modify a regulation or regulatory program, the necessary question is: ''What would be the incremental costs and benefits of repealing the regulation or regulatory program.''

C. Other Regulatory Impacts

Despite the weaknesses in the estimates of the costs and benefits of social regulation, the estimates of the costs and especially the benefits of the other types of regulation are even more problematic. In last year's report, we made the assumption that the costs and benefits of fundamentally different types of regulations and government policies could be aggregated and displayed in one table, with caveats. In doing this, however, we were adding regulatory programs together that had quantified costs and unquantified benefits with regulatory programs that had quantified costs and quantified benefits. We also added together the direct compliance costs of social regulation with the indirect, mostly consumer surplus, losses of economic regulation. However, direct compliance costs may have significantly different long run effects than indirect consumer surplus losses. We have concluded this year that such totals are more misleading than helpful, even with extensive explanation of the absent benefit estimates and the apples and oranges and other problems. To prevent confusion, this year we are presenting the estimates separately in table 4.

Table 4 presents a list of the other types of regulation or regulatory-like activities. In some cases we do not agree that these activities are true regulations or should be considered in the same category with what we have classified as social regulation. However, this wide range of activities was noted by several commenters who urged us to include them in this year's report. Table 4 also lists costs and benefits, and is followed by a discussion of each.

1. Efficiency Losses From Economic Regulation

In last year's report, we presented an estimate that the efficiency costs of economic, i.e., price and entry, regulation amounted to about $71 billion. This is based on an estimate by Hopkins (1992) of $81 billion, which we adjusted downward by $10 billion to account for the deregulation and increase in competition that has occurred in the financial and telecommunications sectors since Hopkins' estimates were made in 1992. Our estimate has recently been corroborated by analysis in a recent, comprehensive two volume Organization for Economic Cooperation and Development (OECD) report, OECD Report on Regulatory Reform (OECD 1997), which attempts to estimate the benefits of further economic deregulation of five sectors of the economy (electricity, airlines, trucking, telecommunications, and retail and wholesale distribution) for five countries (the U.S., Japan, Germany, France, and the U.K.). Adding up any remaining benefits from deregulating these sectors and using a macroeconomic model to simulate the economy-wide effects on GDP, the OECD estimated that U.S. GDP would increase by 0.9 percent from these actions. This estimate implies that the current costs of regulation in these sectors is $68 billion (0.9 percent of 1996's GDP of $7.6 trillion). Although the two estimates are not strictly comparable, because our estimate of $71 billion includes import restrictions and the OECD estimate does not and our estimate is only for Federal regulation and the OECD estimate includes State and local as well as National, the two estimates are close enough to be mutually supportive.

There appear to be no reliable quantified estimates of the total benefits of economic regulation. We pointed out last year that price regulation of natural monopolies does have the potential to provide consumer surplus benefits. However, most economists believe that few natural monopolies, except perhaps in local distribution markets, have long staying power because of the globalization of markets and rapidly changing technology. Over time both the benefits and costs of regulation (assuming regulation does not change) are eroded by changes in technology and adaptive behavior, i.e., the rising baseline phenomenon discussed above.

[9] Admittedly this is a crude estimation procedure because Hahn's inventory of rules begins in 1990 and ours extends back to 1987. Consequently, we are assuming that the relationship between costs and benefits that Hahn found for the later period extends back three years. Still, we know of no other approach to fill this gap in the data until RIAs for these years are re-examined.

The static welfare benefits of economic regulation are not likely to be long lasting in a dynamic world. The OECD report also implies that few benefits are produced by sectoral entry restrictions. The report points out that the loss of universal service may be a concern, but states that methods besides regulation, e.g., targeted subsidies, can be adopted to provide services to worthy entities less able to pay full costs. In table 4 we enter under the benefits of economic regulation the term ''expected to be small.''

Last year, we received comments from several independent economic regulatory agencies suggesting that we had not emphasized the potential benefits of economic regulation enough. The comments made good points. Economic regulatory agencies are producing significant benefits. However, these benefits do not flow from their imposing new restrictions on entry. Rather, the benefits stem from their efforts to open up markets and promote competition, which often means preempting State competition or correcting past mistakes. In other words, some agencies view the reduced costs created by deregulating as a benefit of regulation. The correct view is determined by the baseline. Is the baseline the existing patchwork of State and Federal regulation, which has produced artificially constructed telecommunications and financial services firms, or the more competitive environment that most likely would have existed if we had not had these restrictions? There is no inconsistency in saying that economic regulation has produced few significant benefits, as Hahn and Hird (1992) state in summarizing the consensus view of economists on this subject, and saying that economic regulatory agencies are currently providing important benefits to society by promoting competition.

The OECD study points out the important role that regulators have in smoothing the transition toward a more competitive environment. Regulators must carefully consider the issues of stranded capital costs, unemployment, and universal service as competition is introduced. However, the long run benefits of reform appear to have been worth the transitional costs. The OECD study points out that the US's regulatory reform efforts have already produced major benefits, especially compared to the other major industrial countries. The study estimates that the average GDP gain for the other seven countries from deregulation of the five sectors would be 4.7 percent, ranging from 3.5 percent for the U.K. to 5.6 percent for Japan. The 4.7 percent of GDP estimate would be equivalent to $360 billion if applied to U.S. GDP. The study also points out that a significant portion of the 0.9 percent remaining benefits for the U.S. is likely to be achieved by regulatory reform efforts already underway because of the Telecommunications Act of 1996 and the early State efforts at electricity restructuring. Clearly economic deregulation does not imply that the economic regulatory agencies' jobs are done.

2. Disclosure Regulation

A second type of regulation often mixed in with economic regulation is information disclosure. There is a strong consensus among economists that regulations requiring the disclosure of information about the price and quality of products and services can produce significant benefits for consumers and improve the functioning of markets when this information would not otherwise be available. Our estimate, based on burden-hour calculations for the independent regulatory agencies, e.g., SEC, FCC, FTC, reported in OMB's Information Collection Budget for FY 1998 (272 million hours) and Hopkins' opportunity costs of time estimate ($26.50 per hour), is that disclosure costs are about $7 billion. Although benefits have not been quantified, we expect that they are significantly greater than $7 billion.

3. Transfers From Economic Regulation

Economic regulation often produces income transfers from one group to another. These transfers are not social costs or benefits; they neither create new net benefits for society nor reduce society's scarce resources. Consequently benefit-cost analysis is not appropriate or meaningful for evaluating transfer programs. As the Best Practices document makes clear, distributional analysis, which should be part of the economic assessment, is the proper method of analyzing transfers. Table 4 includes an estimate for transfers based on the Hopkins approach that assumes that the transfers created by economic regulation are about twice the economic efficiency loss. The estimate is $140 billion (two times $70 billion), which we enter in both the costs and benefits columns.

Although as one commenter pointed out (Hopkins 1997), transfers may be associated with real lobbying costs, this fact of life does not justify equating transfer costs with social costs. Lobbying goes on for all sorts of Government policies including expenditure, tax, and regulatory policies whether they exist or not, which are impossible to measure separately. For example, lobbying goes on in an attempt to impose regulations that do not now exist and therefore have no efficiency costs. In this case, the multiple of two times the efficiency loss would estimate social costs of zero. The best approach to including these types of costs is by directly estimating the costs of lobbying rather than using a multiple of economic efficiency losses. Once that is done it is not clear how to evaluate the social benefits of lobbying, which clearly produces benefits because at least some amount of lobbying, i.e., citizen participation, is a necessary part of a democratic government.

4. Tax Compliance

Last year we stopped short of including tax compliance costs and transfer costs in the totals. Although we were criticized for that (Hopkins 1997 and Dudley and Antonelli 1997), other commenters (Hahn 1998) agreed with us that such data should be reported, but not included in the totals. As we pointed out in last year's report, a major reason for not including tax compliance costs in our totals, despite their real nature and obvious concern to the public, is that it would be misleading to add these types of costs to the totals without accounting for the fact that taxes are necessary for the basic functions of government. Cost-effectiveness analysis, not benefit-cost analysis, is the appropriate way to evaluate the efficiency of tax policy. In Table 4, we present an estimate of the paperwork costs of the tax code by multiplying the number of hours of tax preparation time required to file tax forms (5.3 billion in FY 1997) according to OMB's Information Collection Budget (OMB 1998) by an estimate of the opportunity costs of the average hour spent on the forms ($26.50) based on Hopkins (1991). That cost estimate is $140 billion. While we do not have quantitative estimates of the aggregate benefits of tax compliance, they are undoubtedly very large. Tax compliance is necessary for the whole range of services the government provides.

5. Federal Budgetary Expenditures

Several comments also suggested that we report the Federal budgetary costs of regulation. These Federal expenditures include the costs of developing and issuing regulations and enforcing them once they are on the books. For many years, the Center for the Study of American Business at Washington University has compiled Federal Expenditures for the Regulatory Agencies of the U.S. Government. Douglas, Orlando, and Warren (1997) have produced the latest estimates.

Table 4 presents these estimates for both social and economic regulation.[10] For benefits, we reproduce the quantified estimate of the net benefits for social regulation as shown above in table 3 and summarize the earlier discussion of qualitative benefits of economic regulation.

6. Welfare Effects

A final category of regulatory effects, which several commenters suggested we include in our estimates, is the indirect or full welfare impacts of regulation. The estimates presented above for social regulation are mostly estimates of direct compliance costs. However, as our Best Practices document points out, the proper concept of the cost of regulation is the best estimate of the value of the opportunity foregone as a result of the imposition of the regulation. The opportunity costs are likely to be greater than direct compliance costs. In addition to the consumer surplus losses that result when compliance costs drive up prices and reduce consumption of the goods and services produced by the regulated entity, there may be secondary effects on other markets, which reduce consumer welfare. The effects result because regulation increases the overall costs of consumption relative to output and reduces investment and productivity. These effects can only be estimated with a computable general equilibrium model that traces the myriad interrelationships that make up the modern economy. Unfortunately the results of these models are highly dependent on model specifications, which are not transparent to outside reviewers making it difficult to determine the reasonableness of model estimates.[11]

The two most well known models that have been used to estimate the general equilibrium effects apply to environmental regulation. These models find that by 1990 the social welfare effects were about twice the direct compliance cost effects (Hazilla and Kopp 1990 and Jorgenson and Wilcoxen 1990). In table 4 we present this estimate for environmental regulation but not for workplace and product regulation. The reasons are that the estimates were made for environmental regulation and there is no theoretical reason why the effect should be the same for the two types of regulation. This is because the benefits of environmental regulation generally flow to third parties not involved in the production of the regulated product, while the benefits of workplace health and safety regulation and product safety and energy-efficiency regulations mostly flow to parties that are part of the transaction (workers and consumers of the product). This factor causes the costs to the regulated firms to be less than the direct compliance costs because firms will likely eventually reap at least a portion of the benefits of the regulation through lower employee costs for workplace regulation and higher product quality for product safety and energy-efficiency regulation. If the actual costs of compliance to firms are less than the estimated direct compliance costs, the general equilibrium effects will also likely be smaller.

The general equilibrium or secondary effects of the regulation on the benefit side are less well understood than they are for the cost side. But as discussed in last year's report, the health and safety benefits of regulation, in particular, should result in indirect welfare benefits for the economy. Because a healthier and longer-living population is likely to have a longer time horizon and more optimistic outlook, it is also likely to work more years more productively and save and invest more. These effects could very well expand economic activity and increase the standard of living significantly, especially in the long run.

D. Lessons Learned from Studies of Federal Regulation

A review of several studies of the costs and benefits of regulation offers insights into both the actual effects of regulations and into the problems that attend any estimation of their benefits and costs. Below we discuss the two key studies underlying our estimate of the aggregate benefits and costs of environmental regulation and a new study by Robert Hahn of 106 regulations using prospective estimates of costs and benefits published by the agencies at the time the final rules were issued (Hahn forthcoming). We also review two additional retrospective studies that compare the actual and predicted costs and benefits of regulation.

First, as noted earlier, EPA recently published its Section 812 Retrospective study of the costs and benefits of the Clean Air Act, as required by section 812 of the Clean Air Act of 1990. It estimated that the present value of benefits of the Clean Air Act regulations issued between 1970 and 1990 is $22.2 trillion (central estimate, 1990$). Publication of the Section 812 Retrospective provides an opportunity to compare it with the Hahn and Hird study, which served as the basis for our estimates in last year's report.

Hahn's study expands on his earlier one, which we used in section 2 in our aggregate estimate to cover the years 1987 to 1994 (Hahn 1996). The 106 final regulations with both costs and benefits in the new study were issued between 1982 and mid-1996 by EPA, OSHA, NHTSA, HHS, HUD, and USDA. Hahn uses consensus estimates to value reduced units of pollution and increased life-years to calculate benefits of health, safety and environmental regulation. He takes as given the quantity estimates of benefits and the monetized estimates of costs found in the agency-produced regulatory impact analyses. He also converted to constant 1995 dollars and used a 5 percent discount rate to put costs and benefits in a consistent present value framework. Hahn estimated that the net present value of benefits of the 106 regulations is about $1.6 trillion. However, he also found that not all agency rules provided net benefits. In fact, less than half of all final rules provided benefits greater than costs. The main reason for his large estimate of net benefits and relatively poor performance for many individual regulations was that a few rules provided most of the net benefits. NHTSA's automatic restraints in cars and EPA's lead phasedown in gasoline provided just over 70 percent of total net benefits (Hahn forthcoming, p. 15).

1. EPA's Retrospective Report to Congress on the Benefits and Costs of the Clean Air Act

EPA's Section 812 Retrospective represents the culmination of a six-year effort by EPA. The Section 812 Retrospective also reflects, as required by section 812, peer review by an independent, external panel of economists, health scientists, and environmental scientists known as the Science Advisory Board Council on Clean Air Act Compliance Analysis (Council). The Council provided detailed review and guidance throughout each step of study design, implementation, and report drafting. The quality and reliability of the Section 812 Retrospective was addressed by the Council in its review closure letter by stating that the Council ''finds that the Retrospective Study Report to Congress by the Agency is a serious, careful study and employs sound methods along with the best data available.'' [12] The Council further concluded that the Section 812

[10] Note that they do not consider the Internal Revenue Service to be a regulatory agency and therefore do not include it in their estimates. Their approach is consistent with ours and inconsistent with Hopkins (1997).

[11] See Hahn and Hird, pp. 244–246, for a discussion of these problems and several others.

[12] SAB Council, letter to EPA Administrator Browner, July 8, 1997, p. 1.

Retrospective's findings are ''consistent with the weight of available evidence.'' [13]

The Section 812 Retrospective presents estimates of monetized benefits ranging from $6 to $50 trillion (present value in 1990$) over the period from 1970 through 1990, with a central estimate of $22 trillion. Over this same period, the Section 812 Retrospective estimated direct compliance expenditures of roughly $0.5 trillion. The estimated net monetized benefits for the 1970 to 1990 period range from $5.1 to $48.9 trillion dollars, with a central estimate of $21.7 trillion. The Section 812 Retrospective also notes that the monetized benefits estimate may understate benefits because a number of benefit categories were not quantified and/or monetized, e.g., air toxics effects and ecosystem effects. Table 5 presents the non-monetized benefits listed by the Section 812 Retrospective.

While the findings of the Section 812 Retrospective suggest that the aggregate historical benefits of the clean air regulatory programs substantially exceed the aggregate costs, the Section 812 Retrospective itself provides the following cautionary note on page ES–10:

> Finally, the results of the retrospective study provide useful lessons with respect to the value and limitations of cost-benefit analysis as a tool for evaluating environmental programs. Cost-benefit analysis can provide a valuable framework for organizing and evaluating information on the effects of environmental programs. When used properly, cost-benefit analysis can help illuminate important effects of changes in policy and can help set priorities for closing information gaps and reducing uncertainty. Such proper use, however, requires that sufficient levels of time and resources be provided to permit careful, thorough, and technically and scientifically sound data-gathering and analysis. When cost-benefit analyses are presented without effective characterization of the uncertainties associated with the results, cost-benefit studies can be used in highly misleading and damaging ways. Given the substantial uncertainties which permeate cost-benefit assessment of environmental programs, as demonstrated by the broad range of estimated benefits presented in this study, cost-benefit analysis is best used to inform, but not dictate, decisions related to environmental protection policies, programs, and research.

In terms of our charge under section 625(a), we must also consider these new benefit and cost estimates in developing an overall estimate of the benefits and costs of Federal regulation. The magnitude of EPA's benefit estimate, $22 trillion over the 1970 to 1990 period, is very large. The expected value of the estimated monetized benefit for 1990 is $1.25 trillion per year. This represents approximately 20 percent of total 1990 Gross Domestic Product and is comparable in magnitude to total 1990 U.S. expenditures on nondurable goods. There are several important elements of the analysis in the Section 812 Retrospective which deserve further discussion in order to understand the basis for the benefit estimates over the 1970 to 1990 period.[14]

(a) Establishing a baseline. The Section 812 Retrospective uses as a counter-factual ''baseline'' the modeled air quality in the United States over the 1970 to 1990 period for a scenario in which control technology and requirements are frozen at the levels mandated in 1970. It assumed that no additional air pollution controls would have been imposed by any other level of government or voluntarily initiated by private entities after 1970. The Section 812 Retrospective acknowledges that this is an obvious oversimplification and that, in fact, State and local governments as well as private initiatives were responsible for an important fraction of the estimated benefits and costs over the period from 1970 to 1990.[15] At the same time, it notes that the Federal CAA played an essential role in achieving these results and leaves to others the question of parsing out the precise fraction of costs and benefits attributable to the Federal CAA.[16]

Because the modeled baseline includes significant growth in population, car and truck travel, and economic activity, there is a marked deterioration in baseline air quality over the period from 1970 to 1990. While there is no direct sensitivity analysis of alternative baselines, the available documentation for the ''no control'' scenario suggests that a substantial fraction of the estimated benefits are attributable to the degradation in modeled air quality from 1970 levels, rather than the result of an improvement in air quality from the levels that existed in the United States in 1970.[17]

In any event, considerable uncertainty necessarily surrounds ''what would have happened'' over this 20-year period, rendering all attempts to construct aggregate benefit and cost estimates somewhat speculative.

(b) Key benefit categories. The Section 812 Retrospective developed monetized benefit estimates for ten benefit categories, including mortality, hospital admissions, chronic bronchitis, soiling damage, and visibility. (See table 6.) As indicated by table 6, the monetized benefit estimates associated with reducing exposure to fine particulate matter (PM) account for 90 percent of the total estimated benefits. The discussion below discusses three key elements in developing benefit estimates associated with reductions in PM levels.

(i) Uncertainties in magnitude and causation. The Section 812 Retrospective describes some elements of the uncertainty in the estimates of health risks, focusing on those elements of uncertainty that are most readily quantifiable. For example, it addresses specific, quantifiable elements of the uncertainty in the benefits estimates through the use of a ''Monte Carlo'' analysis. It also presents a thoughtful, qualitative discussion of some of the uncertainties associated with the estimated mortality risk—for example, the effect of an historical trend in particulate matter levels and the effect of intercity movement of population on the concentration-response relationship.

The Section 812 Retrospective offers little discussion, however, of the uncertainty associated with the critical question of the causal relationship between fine particulate matter levels and mortality. It observes that the Clean Air Scientific Advisory Committee has pointed out that a causal mechanism has not been clearly established. It concludes that ''the well-established correlation between exposure to elevated PM and premature mortality is sufficiently compelling to warrant an

[13] Ibid.

[14] ''A final, brief interagency review, pursuant to Circular A–19, was organized in August 1997 by the Office of Management and Budget and conducted following the completion of the extensive expert panel peer review by the SAB Council. During the course of the final interagency discussions, it became clear that several agencies held different views pertaining to several key assumptions in this study as well as to the best techniques to apply in the context of environmental program benefit-cost analyses, including the present study. These concerns include: (1) The extent to which air quality would have deteriorated from 1970 to 1990 in the absence of the Clean Air Act, (2) the methods used to estimate the number of premature deaths and illnesses avoided due to the CAA, (3) the methods used to estimate the value individuals place on avoiding those risks, and (4) the methods used to value non-health related benefits. However, due to the court deadline the resulting concerns were not resolved during this final, brief interagency review. Therefore, this report reflects the findings of EPA and not necessarily other agencies in the Administration.'' See Section 812 Retrospective, p. ES–2.

[15] Section 812 Retrospective, pp. 2–3.

[16] Ibid, p. 3.

[17] Of course, any change in the baseline scenario would also require revision of the cost estimates. The Section 812 Retrospective specifically notes that the ''no control'' scenario avoids the difficulties of sorting out the fraction of costs required to maintain an alternative baseline, such as maintaining air quality at 1970 levels. See Section 812 Retrospective, pp. 2–3.

assumption of a causal relationship and derivation of quantitative estimates of a PM-related mortality.'' [18]

The preamble to EPA's 1996 proposal to revise the National Ambient Air Quality Standard for Particulate Matter (PM NAAQS) discusses at greater length the difficulties associated with the interpretation of specific concentration-response relationships, pointing out that it is the most problematic issue in conducting risk assessments for PM-associated health effects. These include: [19]

(1) The absence of clear evidence regarding mechanisms of action for the various health effects of interest;

(2) Uncertainties about the shape of the concentration-response relationships; and

(3) Concern about whether the use of ambient $PM_{2.5}$ and ambient PM_{10} fixed-site monitoring data adequately reflects the relevant population exposures to PM that are responsible for the reported health effects.

(ii) Timing of effects. The Section 812 Retrospective assumed that reductions in ambient PM concentrations yield contemporaneous reductions in the mortality and chronic health risks associated with long-term exposure. Given that the concentration-response relationships in the underlying study are presumptively thought to be the result of long-term exposure, the assumption of a contemporaneous response—that is, a zero lag in the response—represents only one end in a range of possibilities. It is quite possible, however, that there is a lag in the changes in the risk of chronic health effects and mortality with changes in exposure to particulate matter. Other researchers (World Health Organization, 1996) have assumed the effect of particulate matter exposure does not begin until 15 years of exposure.[20] The incorporation of a latency period can have an important effect on the benefits estimate. The adoption of an alternative latency assumption of 15 years, for example, would reduce the estimated present value of the mortality benefits by a factor of two, given the discount rate of five percent used in the Section 812 Retrospective.

(iii) Valuation of changes in health risk (''benefits transfer''). The Section 812 Retrospective also highlights the difficulties of transferring estimates from other settings to value the projected benefits of a regulatory initiative, e.g., changes in mortality risk. In valuing changes in mortality risk, EPA reviewed 26 studies to develop an estimate of the ''value of a statistical life'' based on the willingness-to-pay (WTP) of individuals to avoid small increases in mortality risk. Using a Weibull distribution to fit the estimates from these 26 studies, the Section 812 Retrospective estimated a mean value of $4.8 million per statistical life (with a standard deviation of $3.2 million in 1990).[21] This estimate reflects a WTP of $5 for a reduction in mortality risk of one in a million.

This estimate is derived from studies involving very small changes in mortality risk. However, the changes in mortality risk associated with changes in particulate matter exposure estimated in the Section 812 Retrospective are roughly 10 to 100 times greater than the changes associated with these valuation studies. When the marginal valuation of $5 for a one in a million change in mortality risk is applied to the ''no control'' scenario where modeled baseline mortality risk is on the order of 1 in a 1000, the resulting WTP estimates for changes in mortality risk represent a large share of each household's annual budget, i.e., household ability to pay. Since the total outlay for risk reduction represents a large share of the household budget, this situation is very different from that examined by the 26 valuation studies where the WTP estimates were a small fraction of household budgets.

(c) Hahn and Hird's estimate for environmental benefits. For its environmental benefit estimate, the Hahn and Hird assessment relied on an analysis by Freeman conducted in the late 1970s (Freeman, 1982).[22] The Freeman analysis largely represented a synthesis of the best existing work of the 1970s. The analysis estimates air pollution control benefits for the year 1978, and water pollution control benefits for the year 1985. Hahn and Hird adjust the Freeman estimates to account for inflation; but these adjustments do not reflect other changes—for example, additional regulations—in the air pollution control program between 1978 and 1988 and in the water pollution program control between 1985 and 1988. For water pollution control benefits, the Freeman analysis may still represent the most comprehensive estimate available. There are, however, several elements of the Freeman analysis that deserve further discussion in order to understand the strengths and limitations of the benefit estimates used by Hahn and Hird.

(i) Establishing a baseline. As noted elsewhere in this report, choice of an analytic baseline can be difficult, since many options are available, and the preferred baseline may be unworkable due to the inadequacy of available data. In the Freeman analysis, different baselines were chosen for the air and water benefits analyses.

The Freeman analysis evaluated the improvement in ambient air quality between 1972 and 1978, and did not consider the deterioration in air quality that might have occurred in the absence of air pollution regulations.[23] In effect, the counterfactual baseline was assumed to be the level of air quality in 1972. As a result, the air quality improvements that were analyzed were much smaller than those incorporated in the CAA Section 812 Retrospective (EPA, 1997). Furthermore, the baseline used for the air benefits analysis was not consistent with that used for Freeman's cost analysis, which estimated all air pollution control costs.

The baseline used for the water analysis, on the other hand, assumed changing population and recreational participation rates between 1972 and 1985. The baseline used for the water benefits analysis was consistent with that used for Freeman's water pollution control cost analysis.

(ii) Key benefit categories. Freeman's air pollution benefits analysis developed monetized benefit estimates for six categories: human health (mortality), human health (morbidity), soiling and cleaning, vegetation, materials, and property values. Approximately two thirds of the monetized benefits were for human health improvements, primarily reduced mortality incidence, due to reductions in ambient air concentrations of particulate matter and sulfur oxides. His analysis does not include any estimate of the benefits arising from reductions in airborne lead (Pb) concentrations, which were a significant source of air pollution control benefits found by later studies. The discussion below addresses 3 key factors to bear in mind when interpreting the primary benefit category, i.e., reduced mortality, found in the air benefits estimates of his analysis.

[18] Ibid., p. 34.

[19] 61 FR 65650. The preamble to the final rule reaffirms these concerns by citing the proposal and a more complete discussion in the criteria document (chapters 10–13) and the staff paper (chapter IV). See 62 FR 38655 and 38656.

[20] Section 812 retrospective, p. D–17.

[21] Section 812 Retrospective, p.44.

[22] See Hahn and Hird (1991 pages 253, 273; Portney (1990) pages 54–60; Freeman (1990 in Portney (1990) page 123.

[23] Implicitly, the Analysis assumed increased state, local, and private initiatives great enough to offset air quality deterioration due to increased economic activity, population growth, and vehicle-miles-traveled (VMT) by automobiles and trucks during the 1972 to 1978 period.

1. Uncertainties in Magnitudes of Physical Effects: The Freeman analysis surveys seven studies from the 1970s which developed a dose-response relationship between particulate matter and human mortality.[24] Based on these studies, Freeman provides a range of possible results, with a ''best-guess'' estimate assumed to be at the midpoint of the range. Since 1978, a number of additional epidemiological studies have been completed on the relationship between particulate matter and human mortality rates. It does not reflect the advances in knowledge achieved in the 1980s and 1990s.

2. Timing of Effects: The Freeman analysis assumed that reductions in ambient PM concentrations yield contemporaneous reductions in the mortality risks associated with exposure to PM. If one were to assume, for example, a significant lag, e.g., many years, between changes in exposure and changes in risk, then the mortality benefit estimates would be reduced.

3. Valuation of Changes in Health Risk: The Freeman analysis assumed a value per statistical life (VSL) of $2.4 million.[25] Since 1978, there have been significant additional contributions to the economic literature on the value of mortality risk. After considering these more recent studies, the Section 812 Retrospective adopted a midpoint of $4.8 million ($1990) as a better estimate on the population's willingness-to-pay for reductions in mortality risk. Use of an alternative valuation for mortality risk would have a significant effect on the aggregate benefit estimate in the Freeman analysis.

Freeman's water pollution benefits analysis developed monetized benefits estimates for four categories: recreation, nonuse, commercial fisheries, and diversionary uses. Approximately half of the monetized benefits are attributable to recreation. This analysis is based on a number of studies carried out in the 1960s and 1970s, with benefits projected forward to reflect projected population and recreational participation rates in 1985. However, these estimates do not include benefits associated with the reduction in toxic loadings in waste water discharges, even though Freeman's cost estimates include ''substantial costs for the control of discharges of these substances'' (Freeman, 1982). Benefits of non-point source pollution control also were not included. Benefits to new and existing recreational users for hiking, picnicking and nature observation that might result from improvements in water quality were also omitted because of the absence of data for these activities.

(d) Summary assessment of Section 812 Retrospective. The discussion above illustrates the difficulty, which we emphasize throughout this report, of developing aggregate estimates of the benefits and costs of major Federal regulatory programs. The results obtained in both the Section 812 Retrospective and the Freeman analysis used by Hahn and Hird appear to be sensitive to choices made concerning the baseline for the analysis and the translation of the reduction of air pollution into human health benefits.

2. Two Other Retrospective Studies

In general, retrospective studies are likely to provide more accurate results than prospective studies because there are fewer unknowns to deal with. Prospective studies must estimate what will happen as a result of a proposed regulation and compare it with what would happen without the regulation (the counterfactual). Retrospective studies only need to measure the actual and estimate the counterfactual. Below we discuss several case studies from the literature that compare retrospective studies with their respective prospective studies. NHTSA recently completed the third in a series of studies of its 1983 center high-mounted stop lamp regulation. In brief the studies found that although benefits exceeded costs, costs had been underestimated by a factor of two and that the effectiveness of the rule had been over estimated by a factor of seven in the prospective study. The second case study examines eight regulations issued by OSHA between 1974 and 1989 by drawing on an Office of Technology Assessment (1995) report and a book by Viscusi (1992) that examined the cost estimates and actual impacts of various OSHA regulations. The case studies reveal that in some cases the agency overestimated expected costs compared to the actual and in other cases it underestimated them. The OTA study itself concluded that the agency had a tendency to overestimate costs because of unanticipated improvements in compliance technology after the regulations were issued. However, as in the NHTSA example, the agency also appears to have overestimated the effectiveness of its rule, if not the benefits.

(a) The Center High-Mounted Stop Lamp Case. A comparison of NHTSA's prospective with its retrospective analyses of its Center High-Mounted Stop Lamp (CHMSL)[26] regulation illustrates how the benefits and costs of a rule can be substantially different in practice than what one would have expected based solely on the prospective work.[27] It further illustrates that early post-rule estimates may differ substantially from long-term estimates. In the case of the CHMSL rule, the Final Regulatory Impact Analysis (FRIA) in support of the rule made what appeared to be an overwhelming case that the rule would generate very large net benefits. The FRIA was based on substantial amounts of experimental data and for many years served as a model of an RIA that consistently employed sound benefit-cost analysis principles. Nevertheless, when compared with NHTSA's long-term evaluation, the FRIA overestimated the actual effectiveness (though not the consequent benefits) of CHMSLs by a factor of more than seven and underestimated the cost by a factor of more than two. Despite these revelations, however, the analyses continue to confirm that the rule generates positive net benefits, though not nearly as large as what one might have expected at the time the rule was proposed or even based on the early post-rule analyses.

(i) 1980 and 1983 Regulatory Impact Analyses. In early 1981 NHTSA proposed to require CHMSLs. At that time the agency estimated in its Preliminary Regulatory Impact Analysis (PRIA) that the rule would reduce rear-end collisions by 35 percent (see table 7). NHTSA estimated this would lead to 1,511,000 fewer crashes per year once the entire passenger-car fleet was so equipped. NHTSA also estimated that an additional 1,339,000 crashes per year would be less severe than they otherwise would have been. The combined value of the savings in property damage would range from $1.3 to $2.3 billion per year. In addition, the PRIA estimated the rule would prevent 66,000 injuries and 533 fatalities per year. NHTSA estimated the cost of the proposal at $49 million per year. Thus the analysis of the proposal held out the

[24] Freeman (1982), pages 63–66. Five of the seven studies relied on the statistical work by Lave and Seskin from 1970, 1973, and 1977.

[25] Freeman (1982), page 68. The estimate of $1 million in 1978 is converted to 1996 using the CPI.

[26] CHMSLs are the ''third tail light'' found on all new cars beginning with the 1986 model year. The purpose of CHMSLs is to reduce the time it takes for following drivers to react when drivers in front of them put on their brakes, allowing them to stop sooner and thereby avoid crashes (or reduce the speed at which impact occurs).

[27] Over the years, NHTSA has conducted a total of five distinct analyses of its rule. These include two prospective analyses (preliminary and final regulatory impact analyses) and three retrospective analyses.

promise of very large net benefits in property damage reductions alone.[28]

NHTSA completed its FRIA and published the final rule in 1983. In response to comments it received on the proposal and in light of some new evidence of the effectiveness of CHMSLs, NHTSA revised several components of its benefit estimates downward. The FRIA also included a somewhat refined cost estimate. The FRIA estimated the effectiveness of CHMSL at 33 percent. In order to provide a more ''conservative'' estimate of the benefits, NHTSA applied this effectiveness rate to a smaller proportion of rear-end crashes than in the PRIA.[29] In the FRIA, NHTSA also assumed a lower value of damage per crash avoided ($510 vs. $1,116 in the PRIA). The result of these and other related adjustments was estimates of 902,500 fewer crashes, $434 million in reduced property damage, 40,000 fewer injuries and no estimate of reduced fatalities.

The effectiveness estimates were based on three separate experimental studies for which CHMSLs had been installed on fleets of taxis and telephone company passenger cars. The three studies covered over 3,000 vehicles and over 150 million vehicle miles. Nevertheless, as early as 1980, NHTSA recognized the possibility that the effectiveness estimate based on experimental studies may overstate the true effectiveness of CHMSLs if there is a ''novelty'' effect which caused following drivers to react more quickly than they would once CHMSLs became commonplace. The effectiveness estimate was critical to the decision to go forward with the rule because it underlies all components of the benefit estimates. To its credit, NHTSA committed at the time it proposed the rule to reassess the effectiveness after the fact, if NHTSA adopted a CHMSL requirement in a final rule.

(ii) 1987, 1989, and 1998 retrospective studies. Since the rule became effective with the 1986 model year, NHTSA has conducted three analyses with the benefit of hindsight. The most important results of these studies are that: (1) The effectiveness of CHMSLs is considerably lower than NHTSA estimated in the PRIA and FRIA; (2) the effectiveness has fallen over time, though it now appears to have stabilized; (3) actual costs are about double those estimated in the RIAs; and, most importantly, (4) despite these findings, the rule still generates net benefits.

In 1987, NHTSA conducted a preliminary evaluation of the effectiveness of production CHMSLs.[30] It found an effectiveness of about 15 percent. Thus, even though the CHMSLs were installed in a small percentage of cars nationwide, i.e., when any ''novelty effect'' would most likely occur, effectiveness was less than half of the estimates in the RIAs.

In 1989, NHTSA conducted the second of its retrospective studies. This study was based on 1987 data, by which time about one-fourth of the passenger car fleet was equipped with CHMSLs. By this time, the estimate of effectiveness had fallen again, to about 11 percent. Despite the drop in estimated effectiveness and a corresponding reduction in the number of accidents prevented compared with the FRIA, the estimated benefits of CHMSLs increased. The number of injuries prevented rose to between 79,000 and 101,000 and the estimate of property damage prevented increased to $774 million per year. At that time, NHTSA also concluded that CHMSLs were unlikely to prevent any fatalities. The reasons for the increase in the benefits estimate despite the reduction in effectiveness is due to three factors: (1) The retrospective estimate includes all accidents (not just urban ones); (2) the injury reduction estimate was based on actual crashes whereas the estimates in the RIAs were modeled based on estimates of the reduced speeds at which crashes that weren't avoided would occur; and (3) the actual value of property damage given an accident was much higher than NHTSA assumed in the FRIA. In other words, had NHTSA used the same methodology and data for the FRIA and the retrospective, each of the benefit categories would contain a value of about one-third of what the FRIA reported, as the difference in effectiveness rates would suggest.

Earlier this year, NHTSA completed its long-term study of the benefits and costs of CHMSLs.[31] This most recent estimate of the effectiveness of CHMSLs is 4.3 percent. NHTSA does not expect it to fall further since it has remained steady throughout the last seven years of data NHTSA has analyzed (1989 to 1995). Part of the decline in effectiveness between the 1989 study and this one is attributable to a further refinement in NHTSA's methodology which more accurately controls for vehicle age, which is a factor in rear-end crashes. (Had NHTSA used the same methodology in the 1989 study, the effectiveness would have been about 8.5 percent, rather than 11.3 percent, and the corresponding benefits would have been proportionately lower.) Thus, the long-term effectiveness of CHMSLs is about one-eighth of NHTSA's original estimate, while the costs are more than double. Even so, these estimates imply that the rule continues to produce net benefits, though not nearly as large as what NHTSA estimated prospectively.

The FRIA included an aggregate cost estimate of $70 million ($7 per vehicle) in each of the first two years and $40 million ($4 per vehicle) each year thereafter. The retrospective analyses estimated the cost at $89 million (about $9 per vehicle) per year, or more than twice the long-term cost estimate in the FRIA.

(iii) Lessons learned from CHMSLs. These analyses confirm what many believe: that benefits and costs are difficult to estimate prospectively. In this instance, the RIAs overstated the effectiveness of CHMSLs despite the advantage of substantial data from field experiments. The estimates of benefits in the FRIA were not nearly as large as those estimates presented in the PRIA. Nevertheless, the FRIA estimates overstated the effectiveness of the rule by a factor of more than seven. The changes in effectiveness estimates over time suggest that it is important to re-evaluate the effects of regulations, particularly where behavioral responses to the regulation may evolve over time.

With respect to cost, even though the only cost component was a fairly simple piece of hardware, the FRIA estimate was less than half the actual cost. It is interesting that, in their comments on the proposed rule, the three domestic manufacturers estimated costs in the $8 to $15 range. The low end of this range was lower than NHTSA's actual (long-term retrospective) estimate and the high end was only slightly further from actual costs than the FRIA estimate.

[28] Since the costs occur when the vehicles are manufactured and the benefits occur over the lifetime of the vehicle, it is inappropriate simply to subtract annual costs from benefits. Even after discounting, however, the PRIA estimates would yield net benefits of between $600 million and $1.3 billion annually in property damage alone.

[29] For example, the estimate excluded rural accidents, which account for nearly one quarter of all accidents, because the test fleets were driven in urban areas only thus leaving NHTSA with no evidence that CHMSLs would be effective in rural settings. As NHTSA later discovered, the actual effectiveness was about the same between urban and rural settings.

[30] This study did not attempt to evaluate the benefits in a broader sense or the costs.

[31] In the early 1990s, NHTSA extended the CHMSL requirement to include ''light trucks,'' i.e., minivans, sport-utility vehicles, and pickup trucks, which comprise about 40 percent of the fleet. The estimates in the long-term study include the effects on these vehicles as well. However, in order to facilitate comparisons with NHTSA's previous estimates which pertained to cars only, all aggregate estimates in this study have been reduced by 40 percent to reflect the effects on cars only.

(b) Eight OSHA cases. The Office of Technology Assessment was asked by Congress in 1992 to examine how well OSHA had estimated the impacts of the regulations it had issued. OTA attempted to answer this question by comparing OSHA's prospective analysis of impacts with actual outcomes for a selective set of regulations. Although OTA did not directly attempt to estimate actual benefits, in some cases they can be inferred from the discussion and in other cases other information sources, e.g., Viscusi 1992, can be used. Because of funding constraints, three of the eight cases—vinyl chloride, cotton dust, and ethylene oxide—were chosen because existing studies had already been done. For the other five, new retrospective studies were commissioned.

The eight cases examined exhibited a variety of outcomes. Table 8, based on our analysis of the report's findings as well as other information, shows that costs and benefits were both over-and underestimated and that benefits were sometimes overestimated by OSHA in its prospective analyses of the impacts of the rules. The 1974 regulation of vinyl chloride is often cited as an example of an agency overestimating costs, although to be fair to OSHA the cost estimate was supplied by industry and OSHA at that time did not conduct its own economic analyses of prospective regulations. When cotton dust was issued four years later, the agency was conducting economic analyses for major rules. Cotton dust is also often cited as an example of the agency overestimating compliance costs. OSHA, itself, contracted for a retrospective study of the regulation five years after the rule was issued but before the final controls took effect. The study found that OSHA had earlier overestimated actual capital costs by a factor of five (Viscusi 1992). The later study also found that benefits had also been overestimated by at least two fold because of mistakes in methodology and overcounting of the number of exposed individuals.

In the secondary lead smelters case, also issued in 1978, OSHA underestimated costs and overestimated benefits. The OTA report (p. 62) points out that as of 1995 secondary lead smelters were not able to comply with the engineering controls requirement to reduce air-lead levels to the permissible exposure limit because compliance was economically infeasible, i.e., costs had been underestimated. However, smelters had found less expensive and more direct ways than engineering controls to reduce blood-lead levels, the key health indicator and performance goal. In other words, reducing air-lead levels through engineering controls was not needed to attain the sought-after health benefits. The benefits of engineering controls had been overestimated.

In the 1984 ethylene oxide regulation of hospitals, OTA found that OSHA had underestimated the costs of ventilation equipment but that hospitals had little trouble complying with the standard by other means. OTA found that overall hospitals spent more than expected, but that was because they brought exposure levels down significantly below the regulated level. On average, the agency had estimated costs about right.

The agency appears to have overestimated costs by about a factor of two for metal foundries in its 1987 regulation of formaldehyde because firms used low-formaldehyde resins rather than the predicted ventilation controls to attain compliance.

The next three case studies were for safety standards and the findings are difficult to summarize. The OTA study did not directly estimate costs or benefits for grain handling but found that the standard was economically feasible. The PSDI power presses and powered platforms rules were actually attempts at deregulation. In both cases the cost savings that were predicted failed to materialize because firms did not take advantage of the newly offered flexibility, presumably because the agency had underestimated the costs and/or overestimated the benefits of the flexibility. (See OTA 1995 p. 62.)

Looking at this evidence, OTA concluded that OSHA tended to overestimate costs because new technology was often developed between the time the analysis was done, which in several cases was several years before the final rule was issued, and the compliance date. The report recommended that the agency consider the dynamic nature of technology including the possibility of ''regulation-induced innovation'' in order to set lower compliance levels (p. 11). However, there is an opportunity cost to forcing innovation that is being neglected. The resources that are directed at reducing compliance costs by developing new technologies have to be pulled from other projects, which presumably the company thought had a larger potential for payoff. Since adding another constraint to the economic system is not likely to increase the overall rate of technological progress for the economy, ''regulation-induced innovation'' is not likely to be the ''win-win'' situation that the report suggests (p. 53).

Taken as a whole, these retrospective studies show that OSHA has both underestimated and overestimated costs, sometimes by large amounts. At the same time, in instances where there are clear data, OSHA appears generally to have overestimated benefits. Although there are important cases of overestimating costs because technological progress and learning-by-doing over time reduced expected costs, it is not clear that agencies should compensate for this tendency by reducing costs estimates. These same factors may also lead to a tendency to overestimate benefits.

Chapter II: Estimates of Benefits and Costs of This Year's ''Economically Significant'' Rules

A. Scope

In this chapter, we examine the benefits and costs of ''each rule that is likely to have a gross annual effect on the economy of $100,000,000 or more in increased costs,'' as required by section 645(a)(2). We have included in our review those final regulations on which OIRA concluded review during the 12-month period April 1, 1997, through March 31, 1998. This ''regulatory year'' is the same time period we chose for last year's report. We chose this time period to ensure that we covered a full year's regulatory actions as close as practicable to the date our report is due, given the need to compile and analyze data and publish the report for public comment. In addition, we thought it would be useful to adopt a time period close to that used for the annual OMB report required by the Unfunded Mandates Reform Act of 1995.

The statutory language categorizing the rules we are to consider for this report is somewhat different from the definition of ''economically significant'' in Executive Order 12866 (section 3(f)(1)). It also differs from similar statutory definitions in the Unfunded Mandates Reform Act and subtitle E of the Small Business Regulatory Enforcement Fairness Act of 1996—Congressional Review of Agency Rulemaking. Given these varying definitions, we interpreted section 645(a)(2) broadly to include all final rules promulgated by an Executive branch agency that meet any one of the following three measures:

- Rules designated as ''economically significant'' under section 3(f)(1) of Executive Order 12866
- Rules designated as ''major'' under 5 U.S.C. 804(2) (Congressional Review Act)
- Rules designated as meeting the threshold under title II of the Unfunded Mandates Reform Act (2 U.S.C. 1531–1538)

This year we also include a discussion of major rules issued by independent regulatory agencies, although we do not review these rules under Executive Order 12866. This discussion is based on data provided by these agencies to the General Accounting Office (GAO) under the Congressional Review Act.

During the regulatory year selected, OIRA reviewed 33 final rules that met the criteria noted above. Of these final rules HHS submitted 10; EPA nine; USDA five; DOI and DOE two each; DOL, DOT, DOJ, and VA one each. In addition three agencies, DOL, HHS, and Treasury, worked together to issue one common rule. These 33 rules represent about 14 percent of the 230 final rules reviewed by OIRA between April 1, 1997, and March 31, 1998, and less than one percent of the 4,720 final rule documents published in the **Federal Register** during this period. Nevertheless, because of their greater scale and scope, we believe that they represent the vast majority of the costs and benefits of new Federal regulations during this period.

1. Overview

As noted in chapter I of last year's report, Executive Order 12866 ''reaffirms the primacy of Federal agencies in the regulatory decision-making process'' because agencies are given the legal authority and responsibility for rulemaking under both their organic statutes and certain process-oriented statutes, such as the Administrative Procedure Act, the Unfunded Mandates Reform Act, and the Small Business Regulatory Enforcement Fairness Act. The Executive order also reaffirms the legitimacy of centralized review generally and in particular review of the agencies' benefit-cost analyses that are to accompany their proposals. The Executive order recognizes that in some instances the consideration of benefits or costs is precluded by law. For example, the primary National Ambient Air Quality Standards under the Clean Air Act are to be health-based standards set by EPA solely on the basis of the scientific evidence. A variation is the Occupational Safety and Health Act, where health standards must be based on reducing significant risks to the extent doing so is economically and technologically feasible. However, the Executive order requires agencies to prepare and submit benefit-cost analyses even if those considerations are not a factor in the decision-making process. Again, it is the agencies that have the responsibility to prepare these analyses, and it is expected that OIRA will review (but not redo) this work. The costs and benefits identified may be attributable solely to the regulation in question, where the agency has substantial discretion, or they may in fact be attributable just as much to the act of Congress that they are implementing.

Reviewing for this report the benefit-cost analyses accompanying the 33 final rules listed in table 9, we found, as we did last year, a wide variety in the type, form, and format of the data generated and used by the agencies. For example, agencies developed estimates of benefits, costs, and transfers that were sometimes monetized, sometimes quantified but not monetized, sometimes qualitative, and, most often, some combination of the three. Generally, the boundaries between these types of estimates are relatively well defined.

2. Benefits and Costs of Economically Significant/Major Final Rules (April 1997 to March 1998)

(a) Social Regulation. Of the 33 rules reviewed by OIRA, 22 are regulations requiring substantial additional private expenditures and/or providing new social benefits.[32] (See table 9). EPA issued nine of these rules; USDA three; HHS three; DOI and DOE two each; DOT and DOL one each; and HHS/DOL/Treasury jointly issued one rule. Agency estimates and discussion are presented in a variety of ways, ranging from a purely qualitative discussion, e.g., the benefits of EPA's toxics release inventory rule, to a more complete benefit-cost analysis, e.g., DOE's energy conservation standards for refrigerators and freezers.

(i) Benefits analysis. Agencies monetized at least some benefit estimates in a number of cases including: (1) USDA's $2.41 billion over 15 years from the effects of its environmental quality incentives program on net farm income, pollution damage reductions, and wildlife enhancements; (2) EPA's $12 to $57 million per year in terms of better water quality from its pulp and paper effluent guidelines rule; and (3) DOE's $7.62 billion over 30 years in energy savings from its energy efficiency rule for refrigerators and freezers.

Of the 22 (non-transfer) rules listed in table 9, agencies monetized all the benefit estimates that they were able to quantify in eight cases. In five cases, agencies provided some of the benefit estimates in monetized and quantified form, but did not monetize other, important components of benefits. DOE's two energy efficiency rules monetized the value of energy savings and quantified, but did not monetize, the power plant emission reductions associated with the reduced energy consumption. DOL's respiratory protection rule monetized the out-of-pocket savings associated with its estimate of injury and illness reductions, but monetized neither the other aspects of those injuries and illnesses (such as pain and suffering) nor the fatalities avoided.

In three cases, agencies provided quantified but not monetized benefit estimates. These included: (1) HHS's 297 to 1306 life-years extended as a result of its organ transplant rule; (2) EPA's 593,000 tons of nitrogen oxide emission reductions per year from its highway heavy-duty engines rule; and (3) EPA's annualized emission reductions of 385,000 tons of nitrogen oxides, 6,000 tons of hydrocarbons and 4,000 tons of particulate matter from its locomotives rule.

Finally, in six cases, agencies reported neither monetized nor quantified benefit estimates. In many, though not all, of these cases, the agency provided a qualitative description of benefits. For example, HHS' animal feed rule discusses the potential benefits of avoiding an outbreak of ''mad cow'' disease, but does not estimate the probability of such an episode. EPA's analysis of its expansion of its toxic release inventory reporting rule includes a qualitative discussion of making these data available to the public.

(ii) Cost analysis. In 19 of the 22 cases, agencies provided monetized cost estimates. These include such items as: USDA's estimate of $1.65 billion over 15 years for its environmental quality incentives program; DOL's estimate of $111 million per year for its respiratory protection rule; and EPA's estimate of $37 billion per year to achieve full attainment of its revised primary National Ambient Air Quality Standard for particulate matter. For three deregulatory rules—USDA's Sonoran pork and Argentinian beef rules and EPA's PCB disposal rule—agencies' monetized cost estimates were small or zero.

For the remaining three rules, the agencies did not estimate costs. These included DOI's two migratory bird hunting rules and NHTSA's light truck fuel economy rule.

(iii) Net monetized benefits. Thirteen of these 22 rules provided at least some monetized estimates of both benefits and costs. Of those, six have positive net monetized benefits, that is, estimated monetized benefits that unambiguously exceed the estimated monetized costs of

[32] The other 11 are ''transfer'' rules.

the rules. For example, DOE's energy conservation standards for refrigerators and freezers will generate an estimated net benefit of $4.18 billion (present value) through 2030. EPA's PCB disposal rule will result in an estimated net benefit of about $161 million per year. Four rules resulted in negative net monetized benefits. These included DOL's respiratory protection rule and EPA's medical waste incinerator rule. Two rules resulted in monetized benefit estimates that were sufficiently uncertain as to include both possibilities (net benefits and net costs). For example, EPA's pulp and paper hazardous air pollutant rule was estimated to generate between $925 million in net benefits and $1.165 billion in net costs. Finally, one rule (USDA's Sonoran pork rule) was estimated to have $0 benefits and $0 costs.

(iv) Rules with quantified effects of less than $100 million per year. Seven of the rules in table 9 are classified as economically significant even though they have no quantified effects that exceed $100 million in any one year. These deserve comment:

USDA (2 Rules)—Importation of Pork from Sonora, Mexico, and Beef from Argentina: In 1997, USDA began implementing a new general policy allowing, under certain conditions, the importation of animal products from certain regions of countries shown to be free of pests. This policy was promulgated by rule on October 28, 1997 (62 FR 56000, 56027), but was not designated as major because the Department concluded that analysis of the benefits and costs of the general policy was infeasible. Instead, the Department undertook to perform such analyses on each significant action implementing the general policy:

> Because this framework will not be fully implemented until we receive a new request to allow the importation of animals or animal products into the United States, and because we do not know the number or sources of requests we will receive in the future, we cannot estimate the economic impact of this rule as stipulated in E.O. 12866. We are therefore committed to performing a risk assessment and cost-benefit analysis on a case-by-case basis for each request we receive in the near future. [62 FR 56010]

The individual rulemakings concerning the importation of pork from Sonora, Mexico, and beef from Argentina represent the first two applications of this general regionalization policy and were analyzed as if they were ''major'' pursuant to this departmental commitment.

HHS—Substances Prohibited in Animal Feed: FDA estimated that this rule will cost $53 million per year. It did not attempt to estimate the benefits to be expected from the rule because it was unable to estimate the probability of an outbreak of Bovine Spongiform Encephalopathy (''mad cow disease''). However, FDA did estimate that the consequences of an outbreak, should one occur, would be substantial. It estimated the losses from the destruction of exposed livestock would be about $3.8 billion.

DOI—Migratory Bird Hunting (2 Rules): These are unusual rules in that they are permissive rather than restrictive; that is, migratory bird hunting is prohibited absent these annual regulations which allow hunting, setting bag limits and other controls on both early and late season hunts. Thus the rules permit such spending rather than requiring the expenditure of private resources. DOI reports that the National Survey of Fishing, Hunting, and Wildlife Associated Recreation indicated that expenditures by migratory bird hunters (exclusive of licenses, tags, permits, etc.) totaled $686 million in 1991. Based on this estimate, DOI estimated expenditures for duck hunters would be over $400 million per year in 1995. However, this figure is not in the commonly used sense a social benefit.

DOE—Room Air Conditioners: This rule was proposed as part of a substantially larger rulemaking that included seven other types of household appliances, such as water heaters, fluorescent lamp ballasts, and mobile home furnaces. Energy efficiency standards for all eight combined clearly would have been economically significant. Even though the monetized effects of this rule are less than $100 million in any year, the annualized energy savings benefits (about $60 million per year) are substantial. This fact, combined with the rule's history led to the decision to maintain the ''economically significant'' designation.

DOT—Light Truck CAFE: Each year, DOT must establish a corporate average fuel economy (CAFE) standard for light trucks, including sport-utility vehicles and minivans. (DOT also sets a separate standard for passenger cars but is not required to revisit the standard each year.) For the past three years, however, appropriations language has prohibited NHTSA from spending any funds to change the standards. In effect, it has frozen the light truck standard at its existing level of 20.7 miles per gallon (mpg) and has prohibited NHTSA from analyzing effects at either 20.7 mpg or alternative levels. Although benefits and costs are not estimated, DOT's experience in previous years indicates that they may be substantial. Over 5 million new light trucks are subject to these standards each year, and the standard, at 20.7 mpg, is binding on several manufacturers. Some are just above the standard and at least one is currently below 20.7 mpg. Because of these likely, substantial effects, we designated the rule as economically significant even though analysis of the effects was prohibited by law.

(b) Transfer Regulations. Of the 33 rules listed in table 9, 11 were rules necessary to implement Federal budgetary programs. The budget outlays associated with these rules are ''transfers'' to program beneficiaries. Of the 11, two are USDA rules that implement Federal appropriations language regarding home day care meal programs and agricultural policies; seven are HHS rules that implement Medicare and Medicaid policy; one is a DOJ rule regarding immigration policy; and one is a VA rule regarding compensation of veterans who have cardiovascular disabilities.

(c) Major rules for independent agencies. Several commenters suggested that last year we omitted a major category of costs and benefits: the costs and benefits of major rules from the independent agencies. The General Accounting Office (GAO) is required to submit reports on major rules to the Committees of Jurisdiction in both houses of Congress under the congressional review provisions of the Small Business Regulatory Enforcement Fairness Act (SBREFA), including rules issued by agencies not subject to Executive Order 12866 (the so-called independent agencies). We reviewed the information on the costs and benefits of major rules contained in the GAO reports for the period April 1, 1996 to March 31, 1998. According to the GAO reports, five independent agencies issued 41 major rules during this period. The agencies are listed in table 10 along with a summary of the kinds of information provided by the agencies as summarized by GAO.

Table 10 clearly reveals that the independent agencies provide relatively little quantitative information on the costs and benefits of regulations for major rules, especially compared to the agencies subject to E.O. 12866. Indeed, according to a recent GAO report, Regulatory Reform: Major Rules Submitted for Congressional Review During the First 2 Years, (April 24, 1998), the independent agencies themselves reported doing benefit/cost analyses for only eight, or 18 percent, of the 44 major rules they submitted to GAO during this period. That compares to 72 out of 78 rules, or 92 percent, that

GAO examined for the agencies subject to Executive Order 12866. Table 10 also shows that 12 of the 41 rules, or 29 percent, from independent agencies in our sample, which were all in the GAO sample, included some discussion of benefits and costs even though in some cases the agencies reported that they did not do a benefit cost analysis. However, table 10 also reveals that only four of the 41 regulations had any monetized cost information and only one had any monetized benefit information.

The one rule in table 10 that estimated both benefits and costs was an SEC rule amending the Investment Advisors Act of 1940 to exempt certain types of investment advisors from the prohibition of SEC registration as investment advisors. The SEC estimated benefits of $7 million and costs of $930,000.The three other rules for which costs were estimated are the SEC's rule allowing electronic storage for brokers or dealer reporting, which the industry estimated would reduce costs by $160 million per year; a Federal Reserve Board (FRB) bank holding regulation that would reduce paperwork burden by $1.3 million per year; and an FCC regulation that requires that phones in most public facilities be hearing aid compatible with volume controls, which was estimated to increase the costs of a phone by from 50 cents to a dollar.

The only estimate of costs or benefits of approximately $100 million was the industry-supplied estimate of $160 million savings for the SEC's broker/dealer reporting rule. Since we have used a criterion of using only agency or academic peer reviewed estimates, we conclude that the 41 GAO reports contain no information useful for estimating the aggregate costs and benefits of regulations.

3. Best Practices and RIAs

Based on a review of the 21 agency cost-benefit analyses for the period from April 1, 1996 to March 31, 1997, last year's report concluded that we need better information in order to determine whether proposed regulations produce the greatest net benefits. Based on a review of 22 additional agency analyses for the year from April 1, 1997 to March 31, 1998, that conclusion still stands. Nevertheless, agencies are making significant efforts to apply the Best Practices principles in their RIAs. Below we discuss several examples of agencies' application of these principles to their analytical work.

Serious deviations from Best Practices on any one criterion can dramatically diminish the usefulness of the analysis, or worse, lead to analytical results that distort the facts and ultimately result in regulatory decisions that are far from optimal. Because of the importance of ''getting it right,'' we thought it would be instructive to select several criteria from the Best Practices document and discuss some examples of how agencies properly applied them in their regulatory analyses:

- Quantification and monetization of estimates and treatment of qualitative estimates
- Determination of a consistent and reasonable baseline
- Evaluation of regulatory options
- Treatment of bias and uncertainty
- Treatment of future streams of benefits and costs

(i) Quantification, monetization and treatment of qualitative estimates. All monetized estimates are, by definition, given in dollars and (unless there are overlapping effects of rules that are not accounted for) permit ready comparison and aggregation. Monetized estimates of effects are what is most generally considered the basis of benefit-cost analysis. Even when such figures are available, however, care must be taken when interpreting them because they depend for comparability on a number of distinct elements. Specifically, monetized estimates consist of: (1) The dollar value itself; (2) the base year of the dollar used; (3) the initial year in which the effects occur; (4) the final year after which the effects disappear; and (5) the discount rate used to convert future into current values (or vice versa).

Quantified estimates may take the form of a variety of different units, but they share in common a numeric measure. Generally, quantified estimates of benefits, costs, and transfers must be interpreted with the same elements noted above in mind. The most important difference, of course, is that quantified estimates are expressed in units other than dollars. Such estimates may be aggregated only if they are presented in the same or similar units. Also, a quantified estimate should identify the applicable time period, e.g., tons of pollution controlled per year, number of endangered species protected from extinction per decade. Quantified estimates that lack reference to the time periods to which they apply may be highly misleading, and should be converted to similar time periods to be comparable. Indeed, even when estimates of a similar type include explicit reference to their underlying time periods, care must be taken when aggregating or comparing them because of the risk of summing estimates based on different time periods or inconsistent base years.

In contrast, qualitative estimates may not have any units at all, or they may be expressed in units that do not lend themselves to simple comparisons. As has often been observed, it is more frequently the case that costs are monetized and that benefits are more often quantified or presented in qualitative form. Qualitative effects should be evaluated in terms of their uniqueness, reversibility, timing, and geographic scope and severity. These effects are the most difficult to interpret, and this may lead some to give them short shrift. The fact that an effect has not been monetized or quantified does not, however, necessarily mean that it is small or unimportant.

Qualitative effects must be used with care for other reasons as well. Because they tend to be general and descriptive, they may be broader than the incremental effects of the particular regulation being analyzed. For example, in developing a rule designed to address a particular safety problem, an agency may describe the extent of the problem—that is, so many persons injured per year from this particular cause. While important in estimating the benefits of the rule, this figure itself is not a benefit estimate unless and until it is linked to the likely effectiveness of the proposed rule. Finally, qualitative estimates cannot be aggregated at all because they do not contain units that permit arithmetic operations. In addition, not infrequently they fail to contain relevant information about the period of time during which they apply.

(ii) Baseline. One of the criticisms often cited in evaluating RIAs is the failure to use a consistent baseline against which to estimate both benefits and costs, or the failure to adopt a baseline that reflects current and future conditions (including current regulatory requirements). Using inconsistent or incorrect baselines will lead to biased estimates of benefits and/or costs. When this happens, the analysis may incorrectly make one or more of the various regulatory options appear reasonable or vice versa.

The Best Practices document states that the baseline should be the best assessment of the way the world would look absent the proposed regulation. In addition, when more than one baseline appears reasonable or the baseline is very uncertain, the agency may choose to measure benefits and costs against multiple alternative baselines as a form of sensitivity analysis.

In its analysis of the cost impacts for the final PCB disposal rule, for example, EPA considered three alternative baselines reflecting different interpretations of existing regulatory

requirements. EPA's preferred baseline scenario reflects EPA policy as it has evolved over the period since 1979 when EPA published an earlier final rule with regard to PCBs generally (although it does not reflect the special circumstances associated with the disposal of PCB-contaminated ship hulls). A second baseline reflects a literal interpretation of the 1979 rule; a third alternative, the ''special circumstances'' baseline, reflects current EPA policy because the Navy is already disposing of ship hulls in a manner consistent with the new rule. Using these alternative baselines, EPA estimates that the final PCB rule would yield net cost savings ranging from $150 million for the special circumstances baseline to $740 million for a literal interpretation of the 1979 rule. The use of multiple baselines is informative because it illustrates that changes in EPA policy in implementing regulations can have a substantial effect on the cost of a regulatory program. In this case, in the years after EPA adopted a final disposal rule in 1979, changes in EPA policy—especially allowing the disposal of automobile ''shredder fluff'' in municipal landfills—have operated to reduce the cost of the program by more than $500 million per year.

(iii) Regulatory options. The analysis should consider the most important alternative regulatory options in addressing the problem. Failure to do so may give the selected option the appearance of being the best alternative when in fact there are one or more others that result in higher benefits and/or lower costs and thus greater net benefits. It is critical that the alternatives analyzed be reasonable. Analyzing bogus or ''straw man'' options only exacerbates the problem.

The analysis might consider, for example, the use of performance-based standards, different levels of stringency, differential standards for different parts of the regulated population, and differential approaches for assuring compliance. If the proposed regulation is composed of a number of distinct provisions, it is important to evaluate the benefits and costs of the different provisions separately. Particularly in the case of alternative levels of stringency, the analysis should estimate the incremental benefits and costs of each option as compared with the next-less-stringent option.

DOE's final rule setting new energy efficiency standards for refrigerators and freezers, for example, includes analysis of a comprehensive set of options. For each of eight classes of refrigerators, e.g., top-mounted freezer with automatic defrost, DOE estimated the benefits and costs of at least 12 alternative levels of performance standards. For one class, DOE analyzed 28 options. This extensive analysis of alternatives provided DOE with a very rich array of information on the relative effects of alternative standards. For example, DOE's analysis of over 20 alternative performance standards for one class of top-mounted refrigerators enabled it to select an option that resulted in per-unit net benefits more than $200 greater than for the least attractive option considered in the analysis.

(iv) Bias and uncertainty. The analysis should address areas of uncertainty and potential bias. The analysis should also provide a clear discussion of the assumptions underlying the analysis and address the uncertainties that attend these assumptions. Sensitivity analysis helps to identify the truly critical assumptions, thereby enabling the analysts to focus their efforts on further refinements to the analysis in those areas.

The Best Practices document states that where benefit or cost estimates are heavily dependent on certain assumptions, it is essential to identify these assumptions explicitly and to carry out sensitivity analyses based on alternative plausible assumptions.

EPA's analysis for the two rules revising primary National Ambient Air Quality Standards (NAAQS) for ozone and particulate matter (PM) presents a plausible range for the benefits estimates; the range reflects alternative assumptions with respect to the estimates for specific benefit categories (EPA, RIA for PM and ozone primary NAAQS, pp. ES–9 and 10). For example, the analysis presents high and low ozone benefit estimates which reflect differences in the treatment of the possible effect of ozone on premature mortality. Similarly, the analysis presents high and low PM benefit estimates to reflect differences in the treatment of a possible threshold below which PM would have little or no effect on premature mortality.

(v) Future streams of benefits and costs. As discussed above, care must be taken in comparing estimates of effects to assure that they are presented in a comparable time frame. This requires consideration of several factors: (1) The initial year in which the effects occur; (2) the final year after which the effects disappear; (3) the discount rate used to convert future into current values (or vice versa); and (4) the format in which the value is presented.

Format means the characterization of the monetized or quantified effects over time. In the rules on which we are reporting, we found that agencies used a variety of formats:

(1) Annualized values;
(2) Present values;
(3) Constant annual values; and
(4) Other or unknown formats.

From the perspective of benefit-cost analysis, annualized and present value formats are always preferred because they permit aggregation and comparisons within and across regulatory actions. Constant annual values are slightly less desirable insofar as they require the additional step of discounting to permit such aggregation and comparison. Constant annual values are typically found in monetized cost estimates involving Federal budget outlays, and in quantified benefit estimates where agencies have chosen not to discount. Aggregation and comparison within and across regulations generally cannot be performed without a common discounting methodology. Where an agency's estimation methodology follows an unknown format, further research needs to be performed to ascertain how to convert or reconstruct annualized or present value estimates.

The analysis should present a schedule of the stream of benefits and costs where there is a variation in benefits and costs over time or where they occur in different years, e.g., where there is a delay in the timing of benefits relative to the costs. These streams of benefits and costs should either be discounted to yield ''present value'' estimates or ''annualized'' to provide an estimate of annual benefits and costs in a typical year so that they can be considered in a comparable time frame. Failure to do so will bias the analysis in favor of alternatives that deliver benefits later or impose costs sooner.

The Best Practices document refers to OMB Circular A–94 as the basic guidance on discount rates for regulatory analyses. As noted in the A–94 guidance, agencies may also present sensitivity analyses using other discount rates (with a justification for using these alternative rates).

For example, EPA's analysis of its final rule setting both effluent limits for wastewater discharges and air toxic emission limits for pulp and paper mills developed present value estimates using discount rates of three and seven percent for benefit and cost streams over a 30 year period (EPA, Economic Analysis * * *, October 1997, pp.10–3 and 10–4). EPA phased in the recreational benefits over a two-year period (full value in year three and thereafter) and the health benefits over a five year period (full value in year six and thereafter). On the cost side, EPA

assumed the capital costs would be incurred in years one and twenty-one with operations and maintenance costs incurred in the second through thirtieth years. The analysis adopted the 7 percent discount rate in accordance with OMB guidance and used 3 percent, reflecting the social rate of time preference, to reflect the sensitivity of these estimates to alternative discount rates. The benefit estimates (including the lower absolute value of the bound negative benefit estimate) are roughly 50 percent larger and the costs are roughly 40 percent larger using a 3 percent discount rate vis-a-vis a 7 percent discount rate.

4. GAO Report

A review completed by GAO looked at how well the regulatory impact analyses for 20 economically significant health, safety, and environmental regulations issued between July 1996 and March 1997 followed our Best Practices guidelines (GAO 1998). For example, according to GAO, five of the 20 rules examined did not discuss alternatives, six did not assign dollar values to benefits, and one did not assign dollar values to costs—all practices recommended by our guidance (GAO, 1998). In addition, GAO found that the analyses differed in their treatment of assumptions and uncertainty. For example, agencies used various discount rates that ranged from 2.1 percent to 10 percent, and for the six analyses that used an estimate for the value of a statistical life, the estimates ranged from $1.6 million to $5.5 million. GAO does point out, however, that the Best Practices guidance does allow agencies flexibility to vary the assumptions to fit the circumstances of the specific rules, although GAO also points out that in many cases the agencies do not explain why they varied from Best Practice recommendations.

On a more positive note, GAO also reported that according to agency officials, 12 of the 20 analyses were used to help identify the most cost-effective of several alternatives or to cost-effectively implement health-based regulations and that seven of the remaining analyses were used to define the scope and timing of implementation, document and defend regulatory decisions, and reduce health risks at feasible costs. Only one of the analyses played almost no part in regulatory decisions, and that was because the statute was too prescriptive to leave any discretion in implementing the regulation.

As we stated last year:

Although considerable progress has been made in providing micro data in advance of regulatory proposals and in developing the Best Practices guidance, further progress is needed to continue improving regulatory decisions. Specifically, we need to ensure that the quality of data and analysis used by the agencies improves, that standardized assumptions and methodologies are applied more uniformly across regulatory programs and agencies, and that data and methodologies designed to determine whether existing regulations need to be reformed are developed and used appropriately.

Chapter III: Estimates of Benefits and Costs of ''Economically Significant'' Rules, April 1995–March 1998

In last year's report, we recommended that OIRA continue to develop a data base on benefits and costs of major rules. This chapter seeks to respond to that recommendation by presenting the available benefit and cost estimates for individual rules from April 1, 1995 through March 31, 1998. The summary of agency estimates for final rules from the current year (April 1, 1997 to March 31, 1998) is presented in chapter II, table 9. The summary of agency estimates for final rules from the preceding two years (April 1, 1995 to March 31, 1997) is presented in tables 17 and 18.

In assembling agency estimates of benefits and costs, we have:

(1) Applied a uniform format for the presentation of benefit and cost estimates in order to make agency estimates more closely comparable with each other, e.g., provided the benefit and cost streams over time, annualized benefit and cost estimates, etc., and

(2) Monetized quantitative estimates where the agency has not done so, e.g., converted tons of pollutant per year to dollars.

The adoption of a format that allows the presentation of agency estimates so that they are more closely comparable also allows, at least for purposes of illustration, the aggregation of benefit and cost estimates across rules. At the same time we caution the reader that agencies have used different methodologies and valuations in quantifying and monetizing effects and we have attempted to be faithful to the respective agency approaches. In this chapter, we also aggregate benefit and cost estimates for those Federal rules with significant quantified benefit and cost estimates.

As noted in chapters I and II, the substantial limitations of the available data on the benefits and costs for this set of rules raise significant obstacles to the development of a meaningful aggregate estimate of benefits and costs for even a single year's regulations. For example, in many cases agencies identified important benefits of their rules that were not quantifiable. In such cases, we necessarily omitted them from the monetized estimates we develop in this chapter. To the extent that these benefits are substantial, the monetized estimates will understate the total value of the benefits. The discussion below addresses other limitations in the data and outlines the steps we have taken in an effort to overcome some of them.

A. Monetized Benefit and Cost Estimates for Individual Rules

First, we have only included in this chapter those major rules with quantified estimates of benefits and costs. These include six rules from the 1995/96 period, 15 rules from the 1996/97 period, and 13 rules from 1997/98 period. We have excluded 13 rules without quantified estimates of either benefits or costs. (See table 11.) Six additional rules listed in table 12 have also been excluded from further discussion because only quantified cost estimates were available and/or there were only relatively small benefit and cost estimates.

Second, for some of the remaining rules, agencies quantified estimates of significant effects, but did not assign a monetized value to these effects. Some of the quantified effects—for example, small changes in the risk of premature death or serious injury—are frequently identified as outcomes for a variety of rules. In a number of instances, though, agencies did assign monetized estimates to these outcomes.

Differences in valuation across rules are often critical, particularly in comparisons between and among individual rules or programs. Furthermore, the different approaches in the quantification and monetization of these effects across agencies result in an ''apples and oranges'' problem in aggregating estimates; in particular, where effects have been quantified, but not monetized, the different quantitative effects cannot be summed because they are not expressed in common units. In order to address this problem, this section takes the additional step of assigning a monetized value in order to provide a more consistent set of estimates in those cases where agencies only quantified significant effects. We have not, however, attempted to quantify or monetize any qualitative effects identified by agencies where the agency did not at least quantify them.

Agencies have, over the years, taken, and continue to take, several different approaches toward rules that affect small risks of premature death. In some cases, such as FDA's tobacco rule, agencies have quantified and monetized

these effects in terms of ''quality-adjusted statistical life years.'' In other cases, such as FRA's roadway worker protection rule, agencies have quantified and monetized these effects in terms of statistical lives. In still other cases, such as HHS's organ procurement rule and NHTSA's air bag depowering rule, agencies have quantified risks of death in terms of life-years or lives, but have not monetized them. Finally, in some cases, such as FDA's animal feed rule, the agency did not develop a quantified estimate of the rule's mortality effects.

Estimates for the value of a statistical life varied across agencies. For the tobacco rule, FDA estimated benefits based on a value of $2.5 million per statistical life. For the roadway worker rule, FRA used $2.7 million per statistical life. For the upper-bound estimates of EPA's ozone and PM NAAQS rules, the agency used $4.8 million per statistical life; and for its mammography rule, FDA also used $5 million per statistical life.[33] Similarly, agency estimates for the value of a statistical life-year have also varied. FDA used $116,500 per life-year for its tobacco rule; EPA used $120,000 per life-year to produce its lower-bound estimates of benefits in its ozone and PM NAAQS rules; FDA used $368,000 per life-year in its mammography rule. As a general matter, we have deferred to the individual agency's judgment in this area. In cases where the agency both quantified and monetized fatality risks, we have made no adjustments to the agency's estimate.

In cases where the agency provided only a quantified estimate of fatality risk, but did not monetize it, we have monetized these estimates in order to convert these effects into a common unit. For example, in the case of HHS's organ donor rule, the agency estimated, but did not monetize, statistical life-years saved, although it discussed HHS's use of $116,500 per life-year in other contexts. We valued those life-years at $116,500 each. For NHTSA's air bag depowering rule, we used a value of $2.7 million per statistical life. In cases where agencies have not adopted estimates of the value of reducing these risks, we used estimates supported by the relevant academic literature. For DOL's respirator rule, for example, we used $5 million per statistical life. As a practical matter, the aggregate benefit and cost estimates are relatively insensitive to the values we have assigned for these rules because the aggregate estimates are dominated by the FDA tobacco rule and EPA's rules revising the ozone and PM primary NAAQS. Finally, we did not attempt to quantify or monetize fatality risk reductions in cases where the agency did not at least quantify them.

B. Valuation Estimates for Other Regulatory Effects

The following is a brief discussion of our valuation estimates for other types of effects which agencies identified and quantified, but did not monetize.

- *Injury.* For the air bag depowering rule, we adopted the Department of Transportation approach of converting injuries to ''equivalent fatalities.'' These ratios are based on DOT's estimates of the value individuals place on reducing the risk of injury of varying severity relative to that of reducing risk of death. For the two OSHA rules we used a ratio of 20 injuries per equivalent fatality.
- *Change in Gasoline Fuel Consumption.* We valued reduced gasoline consumption at $.80 per gallon pre-tax.
- *Reduction in Barrels of Crude Oil Spilled.* We valued each barrel prevented from being spilled at $2,000. This reflects double the sum of the most likely estimates of environmental damages plus cleanup costs contained in a recent published journal article (Brown and Savage, 1996).
- *Change in Emissions of Air Pollutants.* We used estimates of the benefits per ton for reductions in hydrocarbon, nitrogen oxide (NO_X), sulfur dioxide (SO_2), and fine particulate matter (PM) presented in EPA's Pulp and Paper cluster rule (October, 1997). These estimates were obtained from the RIA prepared for EPA's July, 1997 rules revising the primary NAAQS for ozone and fine PM. We note that in this area, as in others, the academic literature offers a number of methodologies and underlying studies to quantify the benefits. There remain considerable uncertainties with each of these approaches. For each of these pollutants, we used the following values (all in 1996$) for changes in emissions:[34]

Hydrocarbons: $519 to $2,360/ton;
Nitrogen Oxides: $519 to $2,360/ton;
Particulate Matter: $11,539/ton; and
Sulfur Dioxide: $3,768 to $11,539/ton.

Third, in order to make agency estimates more consistent, we developed benefit and cost time streams for each of the rules. Where agency analyses provide annual or annualized estimates of benefits and costs, we used these estimates in developing streams of benefits and costs over time. Where the agency estimate only provided annual benefits and costs for specific years, we used a linear interpolation to represent benefits and costs in the in-between years. In the case of EPA's Federal test procedure rule, for example, the analysis reported emission reductions for only four years, i.e., 2005, 2010, 2015, and 2020. We used linear interpolation to provide benefit and cost streams over the intervening years.

In addition, agency estimates of benefits and costs cover widely varying time periods. For example, EPA's analysis for the pulp and paper effluent guidelines rules developed annualized benefit estimates for a stream of benefits over 30 years. Annualized cost estimates for this rule were based on installation of control equipment in the first year with full replacement of the control equipment in year 21 at the end of the 20-year useful life for the control equipment and operating and maintenance costs after the first year. USDA's analysis of the conservation reserve program provided annual benefit and cost estimates for the five-year period from 1997 to 2002. On the other hand, DOE's analysis of energy conservation standards for refrigerators and freezers evaluated a much longer time frame from 2000 to 2030, and EPA's analysis of its rule setting emission standards for new locomotives used a time frame of forty years (2000 to 2040).

These differences in the time frames evaluated reflect specific characteristics of individual rules. The short time frame of USDA's conservation reserve program rule reflects, for example, the five-year legislative cycle of the farm bills. On the other hand, the longer time frames of DOE's refrigerators and freezers rule and EPA's new locomotives rule reflect the relatively long period required for turnover of the existing stock of equipment and replacement with equipment meeting the new standards. Because there are substantial differences in the time frame of analysis for these rules, we have decided—with the one exception of DOT's air bag depowering rule—to treat the benefit and cost streams as though all of these rules are in place through the year 2050. We made the one exception to this approach for DOT's air bag depowering rule because the rule automatically terminates at the end of five years. We believe that this is a reasonable treatment of the benefit and

[33] There is a relatively rich body of academic literature on this subject. The methodologies used and the resulting estimates vary substantially across the academic studies. Based on this literature, agencies have developed estimates they believe are appropriate for their particular regulatory circumstances.

[34] Where applicable, the lower (higher) end of the value ranges in all of the tables throughout this report reflect the lower (higher) values in these ranges.

cost streams because a number of these rules will not achieve their full effect for many years into the future. In addition, major regulatory programs tend to be long-lived and, thus, the adoption of a longer time horizon appears to be appropriate. This approach holds the baseline constant and does not consider, of course, the potential effect of a ''rising baseline'' as a result of technological change, cultural changes, etc. (See discussion in chapter I.)

Finally, we have not made any changes to agency monetized estimates. To the extent that agencies have adopted different monetized values for effects, e.g., different values for a statistical life, or different discounting methods, these differences remain embedded in tables 13 through 15. Any comparison or aggregation across rules should also consider a number of factors which the presentation in tables 13 through 15 does not address. First, for example, these rules may use different baselines in terms of the regulations and controls already in place. In addition, these rules may well treat uncertainty in different ways. In some cases, agencies may have developed alternative estimates reflecting upper- and lower-bound estimates. In other cases, the agencies may offer a midpoint estimate of benefits and costs, and in some cases the agency estimates may reflect only upper-bound estimates of the likely benefits and costs. Also, in order for comparisons or aggregation to be meaningful, benefit and cost estimates should correctly account for all substantial effects of regulatory actions, including potentially offsetting effects, which may or may not be reflected in the available data.

C. Aggregation of Benefit and Cost Estimates Across Rules

In table 16, we aggregated the estimates for individual rules from tables 13 through 15 by year. This approach yields *ex ante* estimates of the benefits and costs that Federal agencies expected from major rules issued in each of the last three years.

We have several important observations to offer on these aggregate estimates. First, the 1996 HHS rule placing restrictions on the sale of tobacco and EPA's 1997 rules revising the NAAQS for ozone and particulate matter dominate the annualized and present value aggregates presented in table 16. Changes in estimation methodology for these rules, as reflected by the ''plausible range'' adopted by the analysis for the EPA NAAQS rules for ozone and particulate matter, will have a marked effect on the aggregated benefit and cost estimates for the rules published over the period from April 1, 1995 to March 31, 1998. By the same token, the aggregate estimates are not very sensitive to different approaches for the remaining rules.

The presentation of these aggregates as annualized benefit and cost streams or as net present value estimates may obscure the actual timing of benefits and costs. In the case of the tobacco rule, for example, the annualized benefit estimates were estimated to be $9 to $10 billion per year. However, the health benefits associated with successfully reducing the number of young tobacco users will not begin to be realized until after 2015 because of the lag in the adverse effects associated with tobacco use.

In addition, the benefits and costs of the revised ozone and particulate matter NAAQS will only be realized in the years after 2005. These estimates of ''out-year'' benefits and costs are also uncertain. EPA will complete its next periodic review of the particulate matter NAAQS, scheduled for 2002, before it begins implementation of the revised particulate matter NAAQS. If this review yields a ''mid-course'' change in the standard, the estimates of benefits and costs could change. EPA has also expressed a continuing concern with the uncertainty of the full attainment cost estimates because EPA believes technological change over the next decade will yield lower-cost approaches that will achieve the revised NAAQS.

Second, as noted above, there are significant methodological issues that need to be confronted when aggregating estimates from a set of individual rules (as presented in tables 13 through 15) in an effort to obtain an estimate of the total benefits and costs of Federal regulation. These issues include:

(1) Adoption of a reasonable, consistent baseline (it is difficult to patch together a sensible baseline from the differing baseline scenarios adopted across rules).

(2) The use of *ex ante* estimates (versus *ex post* estimates) of the benefits and costs of regulation, e.g., the reliance on *ex ante* estimates may well fail to reflect important changes in taste, innovation by the private sector, or changes in Federal/State/local regulation.

(3) The ''apples and oranges'' problem associated with combining estimates from different studies, i.e., different measures of benefits and costs, double-counting of benefits and costs across related rules, differing approaches to uncertainty such as the use of upper- and lower-bound estimates versus the use of an upper-bound only estimate, different discount rates, etc.

Because of these concerns with aggregating the prospective benefit and cost estimates taken from the regulatory analysis for individual rules, we are interested in comments on:

(1) The merits of aggregating prospective estimates from individual rules to obtain an aggregate estimate of the benefits and costs of Federal regulation.

(2) The best approach to address the concerns with baseline, *ex ante* estimates, and the various ''apples and oranges'' problems identified above.

A final reason that any regulatory accounting effort has limits is the lack of information on the effects of regulations on distribution or equity. None of the analyses addressed in this report provides quantitative information on the distribution of benefits or costs by income category, geographic region, or any other equity-related factor. As a result, there is no basis for quantifying distributional or equity impacts.

Chapter IV: Recommendations

As with last year's report, this year's is to include ''recommendations from the Director of OMB and a description of significant public comments to reform or eliminate any Federal regulatory program or program element that is inefficient, ineffective, or is not a sound use of the Nation's resources' (section 625 (a)(4)). We are soliciting comments on a wide range of issues related to our discussion of the methodology used in evaluating total annual benefits and costs of Federal regulatory programs and on estimates of the benefits and costs of ''economically significant'' or ''major'' rules. In particular, we are soliciting comments on our approach to estimating the total costs and benefits of regulation by combining existing retrospective or *ex post* studies with agency-produced prospective or *ex ante* estimates; the best ways to deal with the baseline and apple and oranges problems discussed above; and whether we have missed important data sources that would fill in the gaps in our estimates. We are also seeking comment on regulatory programs or program elements that are ''inefficient, ineffective, or * * * not a sound use of the Nation's resources.''

In chapter I we presented aggregate estimates of the costs and benefits of several categories of regulation to further the discussion and generate comments that we hope will lead to better estimates. However, these aggregate estimates are at best only general indicators of the importance of regulation undertaken thus far and not guides to future specific regulatory changes. We discussed at some length

the various shortcomings of these estimates, including the problem that, most of them are based either on dated studies of existing regulations or on estimates for proposed regulations.

In chapter II, we presented the prospective cost and benefit data that the agencies had estimated for the major rules that they issued over the period April 1, 1997 to March 31, 1998. These data for individual regulations show that in many, but not all cases, agencies have done a good job following the recommendations of the Best Practices document. The overall picture remains one of slow but steady progress toward the Best Practices standards. In any case, even if Best Practices are fully adhered to in developing regulations, these prospective analyses alone would not be suitable for determining whether existing regulatory programs or program elements should be reformed or eliminated.

In spite of these methodological difficulties, we believe that prospective studies such as those discussed in chapter II do provide useful general information about existing regulatory programs. In this spirit, we developed in chapter III cost and benefit estimates for a set of major regulations issued by the agencies over the last three years by using standardized assumptions and common values on benefits derived from agency practice and the academic literature. These values and assumptions are not necessarily appropriate for all individual regulations but when applied to a set of analyses offer additional general information about agencies' regulatory systems. We are still in the early stages of this process and seek comments on whether this line of analysis should be pursued. In summary, at this stage we do not believe it is appropriate to make recommendations on specific regulatory programs based on the incomplete and uneven data that we discuss at length above. We note, however, that agencies are continuing to reform and improve their regulatory programs. These specific efforts are described at length in the Regulatory Plan, published each fall with the Unified Agenda of Federal Regulatory and Derergulatory Actions.

We have discerned some general themes during our review of the academic literature and analysis of data on the economic impacts of regulation. In particular, we note the general success of large scale regulatory reforms that have embraced industrial or business sectors. For example, the Federal government undertook reforms of the statutory and regulatory regimes that governed practices in the airline, trucking, and natural gas and oil markets in the 1970s and 1980s. The Clinton Administration has continued this work with regulatory reforms in banking, intrastate trucking, securities and financial services, pensions, and telecommunications. In many of these areas, the older regulatory schemes attempted to proscribe entry by firms into lines of business or to limit production for reasons other than health, safety, or environmental protection.

Although there exist theoretical arguments that in the case of natural monopolies entry of new firms could increase costs to consumers, these arguments are based primarily on static models not appropriate for our current dynamic, technological world. The consistency of the movement toward regulatory reform over the past 25 years is a tribute to the benefits that flow from opened markets. It appears that opening up markets to all qualified entities and individuals has been and continues to be a mainstay of regulatory reform. It is worth noting, however, that such regulatory reform does not mean the end of regulation. While outmoded regulatory programs are changed, new regulations are generally needed, particularly during transitions between the old and new systems, to open up markets and ensure that fair competition is maintained. For example, the Telecommunications Act of 1996 directs the FCC to establish the regulation that is needed to allow new entrants access to the local network in order to establish competition in local telecommunications markets. Without access to the local network, there would be little competition.

A. Electricity Restructuring

A new regulatory area in which the Administration is recommending reform is the decades old system of electricity generation. The Administration has transmitted to Congress a bill that would restructure this industry and bring substantial savings to consumers. Economic forces are forging a new era in electricity prices, where electricity prices will be determined primarily by the market rather than by regulation. Under this new system, often called ''retail choice,'' consumers are allowed to choose their electricity supplier, much as they have chosen long distance telephone service for over a decade. Electricity policy is moving in this direction because subjecting utilities to competition will lead to increased efficiency in the industry and thus benefit the economy and the environment.

In the past, electricity customers did not have the ability to choose their supplier. Instead, under State law, utilities generally were monopolies with both a right and responsibility to serve all consumers in a particular area. The State permitted the utility to charge customers a regulated rate for electric power based on the cost of producing such power plus a ''rate of return'' on investment. In general, the electric monopoly system has provided reliable power to electric consumers in the United States. However, a monopoly system has a fundamental weakness: it does not provide incentives to be cost-efficient because a monopoly supplier does not have to compete and essentially has a guarantee that its costs will be recovered.

Under electricity restructuring, competition will replace regulation as the primary mechanism for setting electricity generation prices. Utilities would be required to open up their distribution and transmission wires to all qualified sellers. The transmission and distribution of electricity would continue to be regulated because they will remain monopolies for the foreseeable future. The system would be restructured, not completely deregulated.

1. The Need for Federal Action

The Administration's proposal respects the actions of those States which are in the process of implementing retail competition and seeks to build on, rather than disrupt, those efforts. Nevertheless, effective retail competition is unlikely to happen without Federal legislation. First, electrons do not respect State borders. Accordingly, as States remove the constraints of monopoly franchise territories, electricity markets will naturally become more regionalized.

Only federal legislation can adequately address the needs of these regional markets. For example, to allow for effective and efficient competitive markets, FERC must have regulatory jurisdiction over all owners of transmission facilities. Currently, FERC has no regulatory authority to order open access to transmission facilities by municipal utilities, cooperatives, or federal power entities. Moreover, effective competitive markets require that FERC be given additional regulatory authority to require the formation of Independent System Operators and to address market power issues.

The electric industry is also hampered by statutes which inhibit the development of competitive markets. The entire Federal electricity law framework dates from the New Deal and is premised upon State-regulated monopolies rather than regional

competitive markets. Federal law should be updated so that it stimulates, rather than stifles, competition. For example, the Public Utility Holding Company Act, which regulates utility holding companies, and the ''must buy'' provision of section 210 of the Public Utility Regulatory Policies Act, which requires that utilities buy power from qualified cogenerators and small power producers, should be repealed.

Finally, the States alone cannot obtain the full economic and environmental benefits of competition for American consumers. Without comprehensive Federal electricity restructuring legislation, neither State nor Federal regulators will have the necessary tools to ensure that regional electricity markets are truly competitive and operate as efficiently as possible. Moreover, absent a Federal role, there will be no assurances that support for renewable technologies and other important public purpose programs will continue absent a Federal program. Without such tools, electricity prices will likely be higher and the environmental gains which we expect under the Administration's plan will not be fully realized.

2. Benefits of Electricity Restructuring

The Comprehensive Electricity Competition Plan embodies the overall agenda of the Clinton Administration to expand the economy and improve the environment. A more competitive electricity industry will provide large benefits to individual American consumers as well as being an overall boon to our economy. It will result in lower prices, a cleaner environment, greater innovation and new services, and a more reliable power supply grid. It will also save the government money.

The Department of Energy estimates that retail competition will save consumers at least $20 billion a year on their electricity bills. This translates into direct savings to the typical family of four of $104 per year. Indirect savings, which would arise from the lower costs of other goods and services in a competitive market, are $128 per year for a typical family of four. Thus, total projected savings for such a family are $232 a year.

Competition will also spark innovation in the American economy, creating new industries, jobs, products and services just as telecommunications reform spawned cellular phones and other new technologies. This will further strengthen our nation's position as the most vibrant and dynamic economy in the world.

Major benefits will accrue to the Federal, State and local governments through lower electricity prices. Total government spending on electricity was $19.5 billion in 1995. With competition, these costs are likely to decline by at least 10 percent, a savings of close to $2 billion year. This restructuring dividend will help governments maintain balanced budgets into the future while meeting critical public needs.

Restructuring will also produce significant environmental benefits through both market mechanisms and policies that promote investment in energy efficiency and renewable energy. Competitive forces will create an efficient, leaner, and cleaner industry. For, example, DOE estimates that the Administration's plan will reduce greenhouse gas emissions by roughly 25 to 40 million metric tons in 2010. A generator that wrings as much energy as it can from every unit of fuel will be rewarded by the market. Today, a monopoly supplier recovers its costs regardless of whether it uses its power resources efficiently. Competition also provides opportunities for consumers to vote with their wallets for green power and facilitates the marketing of energy efficiency services along with electricity.

Restructuring also makes possible the introduction of new policy mechanisms such as the renewable portfolio standard and enhanced public benefit funding, which will guarantee substantial environmental benefits notwithstanding market outcomes. The environmental benefits from the Administration's restructuring plan, which includes the renewable portfolio standard and the public benefit fund, will outweigh any negative effects associated with the demand increasing effects of lower prices or other factors.

The Administration's proposal for electricity competition legislation reflect the need for the simultaneous calibration of many elements in an interconnected statutory framework in order to achieve the desired bottom line: achieving the economic benefits of competition in a manner that is fair and improves the environmental performance of the electricity industry.

Our restructuring proposal is best understood in terms of five main objectives: (1) Encouraging States to implement retail competition; (2) protecting consumers by facilitating competitive markets; (3) assuring access to and reliability of the transmission system; (4) promoting and preserving public benefits; and (5) amending existing Federal statutes to clarify Federal and State authority.

B. Need for Further Methodological Progress: Steps Taken, Steps Needed

Last year we made five recommendations to improve the quality of data and analysis on individual regulations and on regulatory programs and program elements as a first step toward developing the evidence needed to propose major changes in regulatory programs:

- That OIRA lead an effort among the agencies to raise the quality of analyses used in developing new regulations by promoting greater use of the Best Practices guidelines and by offering technical outreach programs and training sessions on the guidelines;
- That an interagency group subject a selected number of agency regulatory analyses to *ex post* disinterested peer review in order to identify areas that need improvement and stimulate the development of better estimation techniques more useful for assessing existing regulations;
- That OIRA continue to develop a data base on benefits and costs of major rules by using consistent assumptions and better estimation techniques to refine agency estimates of incremental costs and benefits of regulatory programs and elements;
- That OIRA continue to work on developing methodologies appropriate for evaluating whether existing regulatory programs or their elements should be reformed or eliminated using its Best Practices document as the starting point; and
- That OIRA work toward a system to track the net benefits (benefits minus costs) provided by new regulations and reforms of existing regulations for use in determining the specific regulatory reforms or eliminations, if any, to recommend.

To implement these recommendations, we took several specific steps, which should be viewed as first steps in an ongoing effort:

- After the September 30, 1997 report was issued, we met with interested parties to hear their suggestions for implementing its recommendations and improving the next report. The interested parties included Congressional staffs, agency officials, academic experts, and the public at large at a well attended open meeting sponsored by the Brookings Institution and the American Enterprise Institute. We also put the report on the OMB home page at: http://www.whitehouse.gov/WH/EOP/OMB/html/rcongress.htm and distributed hundreds of hard copies to the interested public. We also discussed the report with our regulatory counterparts

from other countries and with officials at the OECD studying regulatory reform. These discussions have been very helpful, and their influences are reflected in this year's report.

• On December 12, 1997, the Administrator of OIRA sent a memorandum to the Regulatory Working Group made up of the top regulatory officials of the key agencies, requesting that they give greater attention to the analysis of economically significant rules and to focus specifically on the Best Practices guidance. The memorandum also told the agencies of our intention to disaggregate further our total benefit and cost estimates and to provide more information on economically significant rules, including filling gaps by monetizing benefit estimates where the agencies had quantified but not monetized. We have followed up the memorandum with meetings of the Regulatory Working Group and discussions with individual agency officials that emphasized the importance of good analysis.

• We reviewed examples of *ex post* analyses, including those of NHTSA, OSHA, and EPA regulations. This review helped contribute to an investigation of the methodological problems associated with regulatory analysis.

• We convened a meeting of an Interagency Technical Working Group (ITWG) of staff from the major regulatory agencies co-chaired by CEA to examine the methodological issues raised in the first report, review existing regulatory analyses, and propose better estimation techniques useful in evaluating new and existing regulations.[35] The group met several times a month throughout the first half of 1998, and invited individuals with recognized expertise to make presentations about estimation methods. The group heard presentations on methods of estimating the value of mortality risk reduction, the quantification of morbidity, the value of wetlands, and the value of changes in travel time. Materials used in these presentations are available in the OIRA public docket room. Based on these presentations, and its own discussions, the group considered the following recommendations to OMB in the context of OMB's report to Congress:

(1) That OMB complete agency estimates of reductions in mortality risk by estimating the additional longevity, e.g., years of life gained, to complement conventional estimates of statistical lives saved, in instances where supportable methods exist.

(2) That OMB complete agency estimates of small reductions in mortality risk by estimating the value of these changes using appropriate unit values from the literature on willingness-to-pay.

(3) That OMB complete agency estimates of the value of reductions in morbidity, taking into account lags, e.g., ''latency'' periods, if any, in the realization of harm due to disease or injury, using a range of appropriate discount rates.

(4) That OMB complete agency estimates of reductions in morbidity by estimating (1) the value of cases of disease or injury averted, where there are independent estimates of willingness-to-pay to reduce the risks of such disease or injury, and (2) where appropriate willingness-to-pay estimates are not available, an index of loss in function relative to death, such as a quality adjusted life-year approach.

(5) OMB not generally assign values to agency estimates of changes in the quantity or quality of wetlands, without specific information justifying the appropriateness of the unit values to the wetlands affected, given the wide variety of wetlands.

Recommendations (1) and (5) were adopted unanimously. Although the other recommendations enjoyed support from a majority of agencies, they were not supported unanimously. Another recommendation on the value of increases or decreases in travel time was discussed, but no recommendation has yet been made.

• As the report itself shows, we have begun to implement the recommendations that the ITWG discussed and considered in order to develop a data base on the costs and benefits of major rules using consistent assumptions and better estimation techniques to refine estimates of the incremental costs and benefits of regulatory programs and individual regulations. We hope this will enable us to move closer toward developing a system to track the net benefits provided by new regulations and reforms of existing regulation and for identification of specific regulatory reform proposals.

Last year's report established a much needed baseline from which progress toward better data and methods regarding the impacts of Federal regulation can be measured. We indicated that this statutory charge was an ambitious one, but believe a good start was made. This year we report steady progress toward better data and improved analysis. We have refined the aggregate estimates of benefits and costs; made progress in establishing more consistent data for ongoing benefit-cost analyses; widened our own data base from one to three years; further analyzed and refined our understanding of methodological difficulties; and recommended reform in the electricity generation industry.

We continue to view the task as a formidable one that must be approached with the expectation of a long steady movement forward. We believe this report represents a significant step down that path. We intend to continue these efforts to improve the quality of data and analysis needed to put us in a stronger position to continue to make more recommendations for regulatory reforms.

[35] It included representatives of DOE, Commerce, USDA, Treasury, HUD, Interior, Labor, NHTSA, Education, FDA, and EPA as well as CEA and OMB.

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Tables for Draft Report

Table 1:
Estimates of Total Annual Costs and Benefits of Social Regulation as of 1988
(Billions of 1996 dollars)

	Environment			Transpor-tation	Labor	Other	Total
	Hahn & Hird (1991)	EPA	Combined Ranges [a]				
Costs	76 to 99	54 [b]	54 to 99	9 to 12	11 to 12	10 to 15	84 to 138
Benefits	22 to 180	378 to 3,222 [c]	22 to 3,222	34 to 60	not available [d]	not available [d]	56 to 3,282

Sources: Calculations based on information from Hahn and Hird (1991) unless otherwise noted.
[a] Combined ranges from Hahn and Hird (1991) and EPA section 812 retrospective (1997).
[b] Includes water pollution control costs from *Cost of Clean* (1990), air pollution control costs from EPA's Section 812 Retrospective Report (1997) less adjustments for 1998-1990 overlap.
[c] Benefits from air pollution control only, based on EPA section 812 retrospective (1997).
[d] Hahn and Hird (1991).

Table 2:
Estimates of Total Annual Costs and Benefits of Social Regulations Issued Between 1987 and First Quarter of 1998
(Billions of 1996 dollars)

Time Period	Environ-mental	Transpor-tation	Labor	Other	Total
1987-1994					
Costs	42	5	7	5	59
Benefits	58	48	27	39	172
1995-1998					
Costs	24	1	< 1	2	28
Benefits	13- 73	2	1- 3	14-19	30- 97
1987-1998					
Costs	66	6	7	7	87
Benefits	71-131	50	28-30	53-58	202-269

Source: The 1987 to 1994 estimates of costs are from OMB (1996) p. A-5. The 1987 to 1994 estimates of benefits are calculated by taking the benefit/cost ratios for the final rules issued between 1990 and 1995 from Hahn (1996) Table 10-4 and applying them to our costs estimates to derive benefit estimates. (See caveats above and the discussion in OMB (1997) for the rationale for this approach). The benefit/cost ratios are 1.4 for environmental, 9.7 for transportation, 3.8 for labor and 7.9 for other social regulations. The estimates for 1995 through the first quarter of 1998 are derived as described in tables 13 through 16, chapter III. Note that totals may not add because of rounding.

Table 3:
Estimates of Total Annual Costs and Benefits of Social Regulations
(Billions of 1996 dollars as of 1998, Q1)

	Environ-mental	Transpor-tation	Labor	Other	Total
Costs	$ 120- 165	$ 15- 18	$ 18-19	$ 17-22	$ 170- 224
Benefits	$ 93-3,353	$ 84-110	$ 28-30	$ 53-58	$ 258-3,551
Net Benefits[a]	-$ 72-3,233	$ 66- 95	$ 9-12	$ 31-41	$ 34-3,381

Source: Tables 1 and 2.
[a] Lower estimate calculated by subtracting high cost from low benefit. Higher estimate calculated by subtracting low cost from high benefit.

Table 4:
Costs and Benefits of Other Regulatory Activities [a]
(Billions of Dollars)

Activities	Costs	Benefits
(1) Economic Regulations: Efficiency Loss	$ 71	Not estimated but expected to be small
(2) Disclosure Requirements	$ 7	Not estimated but expected to be significant
(3) Economic Regulations: Transfers	$ 140	$ 140
(4) Tax Compliance Costs	$ 140	Not estimated
(5) Federal Expenditures for: (a) Social Regulations	$ 13	$ 34 - 3,381 (Net benefits of social regulation)
(b) Economic Regulations	$ 3	Likely to be significant benefits from deregulation and disclosure requirements
(6) Full Welfare Impact of Environmental Regulation	Twice direct compliance costs	Not estimated but likely to be large

[a] Note that these figures should not be added because they do not all represent social costs or social benefits and may also be interdependent.

Table 5:
Major Non-monetized, Adverse Effects Reduced by the Clean Air Act

Pollutant	Non-monetized Adverse Effects
Particulate Matter	Changes in Pulmonary Function; Other Chronic Respiratory Diseases; Inflammation of the Lung; Chronic Asthma and Bronchitis
Ozone	Changes in Pulmonary Function; Increased Airway Responsiveness to Stimuli; Centroacinar Fibrosis; Inflammation of the Lung; Immunological Changes; Chronic Respiratory Diseases; Extrapulmonary Effects (i.e., other organ systems); Forest and Other Ecological Effects; Materials Damage
Carbon Monoxide	Decreased Time to Onset of Angina; Behavioral Effects; Other Cardiovascular Effects; Developmental Effects
Sulfur Dioxide	Respiratory Symptoms in Non-Asthmatics; Hospital Admissions; Agricultural Effects; Materials Damage; Ecological Effects
Nitrogen Oxides	Increased Airway Responsiveness to Stimuli; Decreased Pulmonary Function; Inflammation of the Lung; Immunological Changes; Eye Irritation; Materials Damage; Eutrophication (e.g., Chesapeake Bay); Acid Deposition
Lead	Cardiovascular Diseases; Reproductive Effects in Women; Other Neurobehavioral, Physiological Effects in Children; Developmental Effects from Maternal Exposure, including IQ Loss [a]; Ecological Effects
Air Toxics	All Human Health Effects; Ecological Effects

[a] IQ loss from direct, as opposed to maternal, exposure is quantified. Source: EPA Section 812 Retrospective (1997), page ES-5.

Table 6:
Mean Present Value Total Monetized Benefits by Pollutant and Endpoint Category
(1970 to 1990 in billions of 1990 dollars)

Pollutant	Endpoint	Monetized Benefits
Particulate Matter	Mortality Chronic Bronchitis Soiling Damage	$ 16,632 3,313 74
Lead	Mortality IQ Effects Hypertension	$ 1,339 399 98
Particulate Matter, Ozone, Lead and Carbon Monoxide	Hospital Admissions	$ 57
Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide	Respiratory Effects	$ 182
Particulate Matter	Visibility	$ 54
Ozone	Agriculture	$ 23
TOTAL	All	$ 22,171

Source: EPA Section 812 Retrospective (1997), Table ES-4 (p. ES-7).

Table 7:
Estimated Benefits and Costs of Center High-Mounted Stop Lamp Rule: Prospective vs. Retrospective Analyses

CATEGORY OF BENEFIT OR COST	Prospective Analyses		Retrospective Analyses		
	Preliminary RIA (1980)	Final RIA (1983)	Preliminary Retrospective (1987)	Short-Term Retrospective (1989)	Long-Term Retrospective (1998)
Effectiveness [a]	35%	33%	15%	11.3%	4.3%
Crashes Avoided per Year	1,511,000	902,500	Not estimated	126,000 [b][c]	55,000 - 82,000 [b] 116,000 - 143,000 [d]
Reduction in Property Damage per Year ($1982)	$1.3-2.3 billion	$434 million	Not estimated	$774 million	$255 million
Reduction in Number of Injuries per Year	66,000	40,000	Not estimated	79,000 - 101,000	35,000 - 42,000
Reduction in Number of Fatalities per Year	533	Not estimated [e]	Not estimated	Little or no observed effect	Little or no effect
Aggregate Cost per Year ($1982)	$49 million	$70 million [f] $40 million [g]	Not estimated	$89 million	$89 million

Notes:
[a] Percent of all rear-end crashes avoided.
[b] Police-reported rear-end crashes.
[c] Larger number of low-speed crashes not estimated.
[d] Estimated total number of rear-end crashes.
[e] Probably few.
[f] First 2 years.
[g] Third and subsequent years.

Table 8:
Estimated Costs and Benefits of OSHA Rules:
Prospective vs. Retrospective

Regulation	Year Issued	Estimated Costs	Estimated Benefits
Vinyl Chloride [a]	1974	Overestimated by a factor of four	Not clear
Cotton Dust [a]	1978	Capital costs overestimated by a factor of five	Overestimated by more than a factor of two
Lead (Secondary Smelters)	1978	Capital costs significantly underestimated	Significant overestimate for engineering controls
Ethylene Oxide (Hospitals) [a]	1984	About right	Not clear
Formaldehyde (Metal Foundries)	1987	Over by a factor of two	Not clear
Grain Handling	1987	Not clear	Not clear
PSDI Power Presses	1988	Underestimated costs, overestimated benefits, or both	
Powered Platforms	1989	Underestimated costs, overestimated benefits, or both	

Source: See discussion in text.
[a] Indicates that OTA relied on an existing study.

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
USDA	Environmental Quality Incentives Program (EQIP)	$2.41 billion (present value) 1997 - 2012	$1.65 billion (present value) 1997 - 2012	"The analysis estimates EQIP will have a beneficial impact on the adoption of conservation practices and, when installed or applied to technical standards, will increase net farm income. In addition, benefits would accrue to society for long-term productivity, maintenance of the resource base, non-point source pollution damage reductions, and wildlife enhancements. As a voluntary program, EQIP will not impose any obligation or burden upon agricultural producers that choose not to participate. The off-farm public benefits associated with on-farm conservation efforts are directly dependent upon the on-farm treatment needs and associated benefits. In the case of non-point source pollution from agricultural sources, for instance, public benefits are not achieved until private land user behavior changes and on-site conservation measures are applied. Some of the off-site benefits are attributable to improvements made to enhance freshwater and marine water quality and fish habitat, improved aquatic recreation opportunities, reduced sedimentation of reservoirs, streams, and drainage channels, and reduced flood damages. Additional benefits are from reduced pollution of surface and groundwater from agrochemical management, improvements in air quality by reducing wind erosion, and enhancements to wildlife habitat. EQIP encourages participants to adopt a comprehensive approach to solving natural resource and environmental concerns. Off-site benefits for pasture and rangeland and total benefits for animal waste management were not estimated due to unavailability of data." [62 FR 28258-9]

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
USDA	Importation of Pork from Sonora, Mexico	$0	$0	"Low-impact scenario: 67k hogs (0.02%), assuming supply elasticity = 0.15 and demand elasticity = -0.44. *Economic impacts on farrow-to-finish swine operators:* output decline≈10k-17k hogs (≤0.02%); price decline≈ $0.05/hundredweight liveweight equivalent.; producers' receipts decline ≈ $10.7 million/yr (0.02%) and are transferred to consumers (as consumer surplus) and Mexican producers (as producer surplus). *Economic Impacts on live-hog dealers/transporters:* 86 trips. High-impact scenario: 134.1k hogs (0.02%), assuming supply elasticity = 0.075 and demand elasticity = -0.44. *Economic impacts on farrow-to-finish swine operators:* output decline≈20k-34k hogs (≤0.02%); price decline≈ $0.11/hundredweight liveweight equivalent; producers' receipts decline≈ $24.5 million/yr (0.2%) and are transferred to consumers (as consumer surplus) and Mexican producers (as producer surplus). *Economic impacts on live-hog dealers/transporters:* 125 trips." [62 FR 25441-15443]

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
USDA	Importation of Beef from Argentina	$49 million/yr (net of transfers from producers)	$0	"Average wholesale U.S. beef prices estimated to decline by $8.27/MT (from $4,402.17/MT to $4,393.9/MT), less than 0.02%. *Effects on U.S. livestock sector:* producers' receipts decline ≈ $40.15 million/yr and are transferred to consumers (as consumer surplus) and Argentine producers (as producer surplus)." [62 FR 34889-34391] "If Argentina were able to fill its 20 KT quota to the U.S.'s uncooked beef market with nonfed beef product, consumer welfare gains of around $90 million annually are possible. These consumer gains, as well as the likely producer welfare losses, would depend on the type of beef and total quantities received in the U.S. from Argentina. The 20 KT of imports will likely consist mainly of nonfed beef. Consumers would enjoy both lower prices and greater supplies, while producers realize lower returns from lower prices, but not lower quantities produced. These gains, even after taking into account the likely producer losses ... produce a net social welfare gain to the United States of $48.7 million ... "...In the aggregate, producer welfare losses of $40.45 million are distributed between the dairy and beef sectors, the latter sector being composed of cow-calf, feedlot and slaughter operations." [62 FR 34392]

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
HHS	Substances Prohibited in Animal Feed	Not estimated	$53 million/yr	"FDA estimated that, if BSE were to occur in this country, the disease would be associated with approximately $3.8 billion in losses due to the destruction of BSE-exposed livestock and the taking of other measures needed to prevent continued BSE proliferation. While FDA could not quantify the expected additional costs to consumers and producers in the United States that would result from the loss of consumer confidence following a BSE outbreak, the agency found that plausible scenarios indicated that the likely drop in the demand for cattle and beef products could cause billions of dollars in lost market values. In addition, FDA noted, but did not attempt to quantify, the value of the human lives that might be lost or the associated medical treatment costs that might follow a domestic outbreak of BSE." [62 FR 30967] "Additional [benefits] that could not be quantified include the lost human lives and medical treatment costs that could result from BSE-related disease, as well as the consumer and producer losses that would result from the expected decrease in the sales and consumption of beef. Sales of medical products and cosmetics containing cattle-derived components could also be affected." [62 FR 30968]

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
HHS	Organ Procurement and Transplantation Network	297-1,306 additional "life-years"/yr	$0	HHS recognizes in its analysis the difficulty of quantifying the costs and the benefits of the rule. The rule discusses the current costs of transplantation and the analysis concludes that the final rule will not substantially increase the costs. Regarding benefits, HHS discusses difficulties associated with assigning value to a statistical life when quantifying the benefits for this rule. The rule also discusses the benefits that arise from public oversight and accountability of the organ transplant system, which will preserve public trust and confidence. Also, a system of patient-oriented information of transplant performance will allow easier comparison of transplant center performance and the use of performance goals will create equity in the system.
HHS	Quality Mammography Standards	$182-263 million/yr	$38 million/yr (annualized over 10 years)	FDA states that it is difficult to determine the increase in the quality of mammograms which the final rule will cause. However, FDA calculates the following benefits assuming a 5-percent improvement. This degree of improvement would prevent 75 women per year from dying of breast cancer within a 20-year period. At $5 million per life saved, the discounted value of this outcome would be $234 million per year. In addition, fewer false-positive screens and decreased treatment costs add about $29 million in annual benefits. FDA points out that an improvement of quality as low as 2 percent would result in the benefits outweighing the costs of the final rule.
HHS/ DOL/ Treasury	Mental Health Parity	Not estimated	$464 million/yr	None reported.

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
DOI	Migratory Bird Hunting (Early Season Frameworks)	Not Estimated	Not Estimated	DOI reports that duck hunters spend an estimated $416 million/yr; unquantified economic stimulus benefits derived from spending on duck hunting; unquantified benefit of value to hunters (consumer surplus) from more than 11 million hunting days per year; unquantified benefit to bird population by reducing overcrowding and ensuring continued use of resource in future.
DOI	Migratory Bird Hunting (Late Season Frameworks)	Not Estimated	Not Estimated	DOI reports that duck hunters spend an estimated $416 million/yr; unquantified economic stimulus benefits derived from spending on duck hunting; unquantified benefit of value to hunters (consumer surplus) from more than 11 million hunting days per year; unquantified benefit to bird population by reducing overcrowding and ensuring continued use of resource in future.

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
DOL	Respiratory Protection	4,046 injuries and illnesses/yr avoided; 932 deaths/yr avoided	$111 million/yr	"The Agency estimates that the standard will avert between 843 and 9,282 work-related injuries and illnesses annually, with a best estimate (expected value) of 4,046 averted illnesses and injuries annually. This reduction is estimated to save $18.8 to $218 million per year, with a best estimate of $93.9 million per year. In addition, the standard is estimated to prevent between 351 and 1,626 deaths annually from cancer and many other chronic diseases, including cardiovascular disease, with a best estimate (expected value) of 932 averted deaths from these causes." [63 FR 1173]
DOE	Energy Conservation Standards for Refrigerators and Freezers	$7.62 billion (present value) in energy savings for purchases between years 2000 - 2030	$3.44 billion (present value) for purchases between years 2000 - 2030	"The estimated environmental benefits from today's final rule (based on the 1997 AEO fuel prices) are, over the period from 2000 to 2030, a reduction in emissions of NO_X by 1,362 thousand tons (1,501 thousand short tons), a reduction in emissions of CO_2 by 465 Mt (513 million short tons) and a reduction in the cost of the emission controls roughly equivalent to the cost of reducing SO_2 emissions by 1,545 kt (1,703 thousand short tons)." [62 FR 23110-11]
DOE	Energy Conservation Standards for Room Air Conditioners	$740 million (present value) in energy savings for purchases between years 2000 - 2030	$290 million (present value) for purchases between years 2000 - 2030	"The Department projects the standards to save 0.64 quad of energy through 2030, which is likely to result in a cumulative reduction of emissions of approximately 95,000 tons of nitrogen dioxide and 54 million tons of carbon dioxide." [62 FR 50122]
DOT	Light Truck CAFE Model-Year 2000	Not Estimated	Not Estimated	None reported

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
EPA	Emission Standards for New Locomotives	385,000 tons of nitrogen oxides; 6,000 tons of hydrocarbons; and 4,000 tons of particulate matter annualized emission reductions (2000 - 2040)	$90 million/yr annualized cost (2000 - 2040)	None reported
EPA	Emission Standards for New Highway Heavy-Duty Engines	593,000 tons of nitrogen oxides annualized emission reductions (2004 - 2023)	$196 million/yr annualized cost (2004 - 2023)	None reported

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
EPA	Pulp and Paper: National Emission Standard for Hazardous Air Pollutants (NESHAP)	-$1.04 - 1.05 billion/yr	$125 million/yr	Benefit estimate includes benefits ranging from $24 - $1,055 million/yr for reductions in emissions of volatile organic compounds and disbenefits ranging from $1 - $1,065 million/yr for increases in emissions of sulfur dioxide and particulate matter. Other quantified (but not monetized) benefits include annual reductions of 139,000 tons of hazardous air pollutants and 79, 000 tons of Total Reduced Sulfur. Other quantified (but not monetized) disbenefits include annual increases of 5,200 tons of nitrogen oxides and 8,700 tons of carbon monoxide. All estimates are for existing sources only; no benefits or costs were estimated for new sources.
EPA	Pulp and Paper Effluent Guidelines	$12 - 57 million/yr	$263 million/yr	Other quantified (but not monetized) annual benefits include lifting of 19 dioxin/furan-related fish consumption advisories; elimination of 3 exceedences of human health ambient water quality concentration standards (AWQC); and elimination of 19 exceedences of aquatic life AWQCs. Unquantified benefits include non-cancer human health effects and improvements in fish and wildlife habitats. All estimates are for existing sources only; no benefits or costs were estimated for new sources.
EPA	Medical Waste Incinerators	$7 million/yr for particulate matter reductions only	$71 - 146 million/yr	EPA states that it cannot quantify or monetize many of the benefits, such as the reduction in the emission of hazardous air pollutants which include cadmium, hydrogen chloride, lead, mercury, and dioxin/furan. In addition, reductions in emissions of sulfur dioxide, carbon monoxide, and nitrogen oxides are expected.

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
EPA	National Ambient Air Quality Standards (NAAQS): Ozone	$0.4 - 2.1 billion in 2010 (partial attainment) ---------- $1.8 - 10.0 billion in 2015 (full attainment)	$1.1 billion in 2010 (partial attainment) ---------- $11.3 billion in 2015 (full attainment)	Benefit estimates do not include anticipated reductions in harmful effects in the following human health areas: airway responsiveness, pulmonary inflammation, increases susceptibility to respiratory infection, acute inflammation and respiratory cell damage, and chronic respiratory damage/premature aging of the lungs. Benefits also do not include effects in the following welfare areas: ecosystem effects in "Class I" areas (e.g., national parks), damage to urban ornamentals, reduced forestry yields, damage to ecosystems, materials damage, nitrates in drinking water, and brown clouds.
EPA	National Ambient Air Quality Standards (NAAQS): Particulate Matter	$19 - 104 billion in 2010 (partial attainment) ---------- $20 - 110 billion/yr (full attainment)	$8.6 billion in 2010 (partial attainment) ---------- $37 billion/yr (full attainment)	Benefit estimates do not include anticipated reductions in harmful effects in the following human health areas: pulmonary function, morphological changes, altered host defense mechanisms, cancer, other chronic respiratory diseases, infant mortality, and mercury emissions. Benefits also do not include effects in the following welfare areas: materials damage (other than cleaning costs), damage to ecosystems, nitrates in water, and brown clouds.
EPA	Toxic Release Reporting ("Community Right-to-Know")	Not estimated	$226 million in the first year and $143 million/yr in subsequent years	This rule will make available to the public information on releases and transfers from these additional facilities of chemicals listed under the Toxic Release Inventory Program.
EPA	Disposal of Polychlorinated Biphenyls (PCBs)	Net cost savings of $150 - $740 million/yr	$14 million/yr	None reported.

TABLE 9: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/97 - 3/31/98
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
			TRANSFER RULES	
Dept. of Agriculture (USDA)				
	Improved Targeting of Day Care Home Reimbursements			
	Peanut Poundage Quota Regulations			
Dept. of Health and Human Services (HHS)				
	Coverage of Personal Care Services			
	Inpatient Prospective Payment Systems for 1998			
	Physician Fee Schedule for 1998			
	Limit on the Valuation of a Depreciable Capital Asset			
	Salary Equivalency Guidelines for Physical Therapy			
	Limitations on Home Health Agency Costs			
	State Allotments for Payment of Medicare Part B Premiums for 1998			
Dept. of Justice (DOJ)				
	Affidavits of Support on Behalf of Immigrants			
Dept. of Veterans Affairs (DVA)				
	Schedule for Rating Disabilities, The Cardiovascular System			

Table 10:
Cost and Benefit Information for Major Rules Issued by Independent Agencies Between April 1, 1996 and March 31, 1998

Agency	Total Rules	Rules with Some Information on Costs or Benefits	Rules with Monetized Information on	
			Costs	Benefits
Federal Communications Commission (FCC)	25	1	1	0
Securities and Exchange Commission (SEC)	10	10	2	1
Federal Reserve Board (FRB)	2	1	1	0
Nuclear Regulatory Commission (NRC)	2	0	0	0
Federal Energy Regulatory Commission (FERC)	2	0	0	0
Totals	41	12	4	1

Table 11:
Major Rules Issued Between April 1, 1995 and March 31, 1998 Without Estimates of Either Benefits or Costs

USDA	1996 Farm Bill Farm Program Karnal Bunt, 1996-1997
HHS	Substances Prohibited in Animal Feed, 1997-1998
DOI	Migratory Bird Hunting (Early Season), 1995-1996 Migratory Bird Hunting (Fall Season), 1995-1996 Migratory Bird Hunting (Early Season), 1996-1997 Migratory Bird Hunting (Fall Season), 1996-1997 Migratory Bird Hunting (Early Season), 1997-1998 Migratory Bird Hunting (Fall Season), 1997-1998
EPA	Phase III Land Disposal Restrictions
DOT	Light Truck CAFE, 1995-1996 Light Truck CAFE, 1996-1997 Light Truck CAFE, 1997-1998

Table 12:
Small Estimates, Not Evaluated for Aggregate Estimate

USDA	Use of the Term "Fresh" for Poultry Labeling Importation of Sonoran Pork Importation of Argentine Beef
DOC	Encryption Items Transferred from U.S. Munitions List to the Commerce Control List
EPA	Lead-Based Paint Activities in Target Housing Toxic Release Inventory: Facility Expansion

Table 13:
Agency Benefit/Cost Estimates for Final Rules
April 1, 1995 to March 31, 1996
(Millions of $1996, Rounded to Two Significant Digits)

Agency	Rule	Category	2000	2005	2010	2015	Annualized Value	Net Present Value
Dept. of Health and Human Services (HHS)								
	Hazard Analysis and Critical Control Points (HACCP): Seafood	Benefits	$ 110- 190	$ 110- 190	$ 110- 190	$ 110- 190	$ 110- 200	$ 1,600- 2,800
		Costs	$ 50- 110	$ 50- 110	$ 50- 110	$ 50- 110	$ 50- 120	$ 740- 1,600
Dept. of Transportation (DOT)								
	Head Impact Protection	Benefits	$ 480- 540	$1,900-2,200	$1,900-2,200	$1,900-2,200	$1,600-1,800	$22,000-25,000
		Costs	$ 170	$ 690	$ 690	$ 690	$ 580	$ 8,000
	Vessel Response Plans	Benefits	$ 40	$ 40	$ 40	$ 40	$ 40	$ 330
		Costs	$ 260	$ 260	$ 260	$ 260	$ 280	$ 3,900
Environmental Protection Agency (EPA)								
	Marine Tank Vessel Loading and Petroleum Refining NESHAP	Benefits	$ 120- 760	$ 120- 760	$ 120- 760	$ 120- 760	$ 120- 760	$ 2,300-10,000
		Costs	$ 120- 160	$ 120- 160	$ 120- 160	$ 120- 160	$ 120- 160	$ 1,700- 2,200
	Air Emissions from Municipal Solid Waste Landfills	Benefits	$ 50- 200	$ 60- 220	$ 70- 230	$ 70- 230	$ 60- 210	$ 820- 2,900
		Costs	$ 90	$ 105	$ 110	$ 110	$ 100	$ 1,400
	Municipal Waste Combustors	Benefits	$ 220- 570	$ 220- 570	$ 220- 570	$ 220- 570	$ 240- 620	$ 3,300- 8,600
		Costs	$ 300	$ 300	$ 300	$ 300	$ 320	$ 4,400

Table 14:
Agency Benefit/Cost Estimates for Final Rules
April 1, 1996 to March 31, 1997
(Millions of 1996$, Rounded to Two Significant Digits)

Agency	Rule	Category	2000	2005	2010	2015	Annualized Value	Net Present Value
Dept. of Agriculture (USDA)								
	Conservation Reserve Program	Benefits	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,200	$ 30,000
		Costs	$ 900	$ 900	$ 900	$ 900	$ 970	$ 13,000
	Hazard Analysis and Critical Control Points (HAACP): Meat and Poultry	Benefits	$ 70- 2,600	$ 70- 2,600	$ 70- 2,600	$ 70- 2,600	$ 70- 2,800	$ 1,000- 38,000
		Costs	$ 90- 110	$ 90- 110	$ 90- 110	$ 90- 110	$ 100- 120	$ 1,400- 1,700
Dept. of Health and Human Services (HHS)								
	Food Nutrition Labeling: Small Business Exemption	Benefits	$ 275- 360	$ 275- 360	$ 275- 360	$ 275- 360	$ 300- 390	$ 4,100- 5,400
		Costs	$ 3	$ 2	$ 1	$ 1	$ 2	$ 30
	Restriction on the Sale and Distribution of Tobacco	Benefits	$9,200-10,000	$9,200-10,000	$9,200-10,400	$9,200-10,000	$9,900-11,000	$140,000-150,000
		Costs	$ 180	$ 180	$ 180	$ 180	$ 180	$ 2,500
	Medical Devices: Quality Regulations	Benefits	$ 270- 280	$ 270- 280	$ 270 -280	$ 270- 280	$ 290- 310	$ 4,100- 4,200
		Costs	$ 80	$ 80	$ 80	$ 80	$ 90	$ 1,200
Dept. of Labor (DOL)								
	Exposure to Methylene Chloride	Benefits	$ 40	$ 40	$ 40	$ 40	$ 90	$ 1,200
		Costs	$ 100	$ 100	$ 100	$ 100	$ 110	$ 1,500

Table 14:
Agency Benefit/Cost Estimates for Final Rules
April 1, 1996 to March 31, 1997
(Millions of 1996$, Rounded to Two Significant Digits)

Agency	Rule	Category	2000	2005	2010	2015	Annualized Value	Net Present Value
Dept. of Transportation (DOT)								
	Airbag Depowering	Benefits	$ 540- 860	$ 0	$ 0	$ 0	$ 170- 270	$ 2,400- 3,800
		Costs	$ 340- 1,600	$ 0	$ 0	$ 0	$ 110- 500	$ 1,500- 7,000
	Roadway Worker Protection	Benefits	$ 30	$ 30	$ 30	$ 30	$ 40	$ 490
		Costs	$ 30	$ 30	$ 30	$ 30	$ 40	$ 480
Environmental Protection Agency (EPA)								
	Accidental Release Prevention	Benefits	$ 170	$ 170	$ 170	$ 170	$ 170	$ 2,400
		Costs	$ 100	$ 100	$ 100	$ 100	$ 100	$ 1,500
	Financial Assurance for Municipal Solid Waste Landfills	Benefits	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
		Costs	-$ 100	-$ 100	-$ 100	-$ 100	-$ 110	-$ 1,500
	Deposit Control Gasoline	Benefits	$ 120- 350	$ 120- 350	$ 120- 350	$ 120- 350	$ 120- 350	$ 1,700- 5,200
		Costs	$ 140	$ 140	$ 140	$ 140	$ 150	$ 2,000
	Acid Rain Phase II NO_x Controls	Benefits	$ 460- 2,100	$ 460- 2,100	$ 460- 2,100	$ 460- 2,100	$ 430- 2,000	$ 6,000- 27,000
		Costs	$ 200	$ 200	$ 200	$ 200	$ 190	$ 2,600
	Federal Test Procedure Revisions	Benefits	$ 140- 820	$ 140- 820	$ 140- 820	$ 140- 820	$ 130- 760	$ 1,700- 11,000
		Costs	$ 200- 250	$ 200- 250	$ 200- 250	$ 200- 250	$ 200- 250	$ 2,600- 3,200
	Voluntary Standards for Light-Duty Vehicles (NLEV)	Benefits	$ 50- 220	$ 130- 590	$ 260- 1,200	$ 380- 1,800	$ 230- 1,000	$ 3,100- 14,000
		Costs	$ 600	$ 600	$ 600	$ 600	$ 640	$ 8,920

Table 14:
Agency Benefit/Cost Estimates for Final Rules
April 1, 1996 to March 31, 1997
(Millions of 1996$, Rounded to Two Significant Digits)

Agency	Rule	Category	2000	2005	2010	2015	Annualized Value	Net Present Value
Environmental Protection Agency (EPA), continued								
	Emission Standards for Marine Engines	Benefits	$ 10- 50	$ 90- 390	$ 180- 810	$ 240- 1,100	$ 150- 680	$ 2,100- 9,400
		Costs	$ 50	$ 310	$ 360	$ 320	$ 270	$ 3,760

Table 15:
Agency Benefit/Cost Estimates for Final Rules
April 1, 1997 to March 31, 1998
(Millions of 1996$, Rounded to Two Significant Digits)

Agency	Rule	Category	2000	2005	2010	2015	Annualized Value	Net Present Value
Dept. of Agriculture (USDA)								
	Environmental Quality Incentives Program (EQIP)	Benefits	$ 270	$ 270	$ 270	$ 270	$ 290	$ 4,000
		Costs	$ 180	$ 180	$ 180	$ 180	$ 200	$ 2,700
Dept. of Health and Human Services (HHS)								
	Organ Procurement and Transplantation Network	Benefits	$ 30- 410	$ 30- 410	$ 30- 410	$ 30- 410	$ 40- 440	$ 510- 6,100
		Costs	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
	Quality Mammography Standards	Benefits	$ 180- 260	$ 180- 260	$ 180- 260	$ 180- 260	$ 200- 280	$ 2,800- 3,900
		Costs	$ 40	$ 40	$ 40	$ 40	$ 40	$ 570
Dept. of Labor (DOL)								
	Respiratory Protection	Benefits	$ 140- 560	$ 140- 560	$ 140- 560	$ 140- 560	$ 590- 2,700	$ 8,200- 37,000
		Costs	$ 110	$ 110	$ 110	$ 110	$ 120	$ 1,700
Dept. of Energy (DOE)								
	Energy Conservation Standards for Refrigerators	Benefits	$ 610	$ 680- 710	$ 790- 860	$ 890- 990	$ 700- 760	$ 9,700- 11,000
		Costs	$ 280	$ 280	$ 280	$ 280	$ 260	$ 3,600
	Energy Conservation Standards for Room Air Conditioners	Benefits	$ 60	$ 70	$ 80	$ 80	$ 80	$ 930- 1,000
		Costs	$ 20	$ 20	$ 20	$ 20	$ 20	$ 300

Table 15:
Agency Benefit/Cost Estimates for Final Rules
April 1, 1997 to March 31, 1998
(Millions of 1996$, Rounded to Two Significant Digits)

Agency	Rule	Category	2000	2005	2010	2015	Annualized Value	Net Present Value
Environmental Protection Agency (EPA)								
	Emission Standards for New Locomotives	Benefits	$ 250- 970	$ 250- 70	$ 250- 970	$ 250- 970	$ 230- 900	$ 3,200- 13,000
		Costs	$ 90	$ 90	$ 90	$ 90	$ 80	$ 1,900
	Emission Standards for New Highway Heavy-Duty Engines	Benefits	$ 0	$ 310-1,400	$ 310- 1,400	$ 310- 1,400	$ 220- 990	$ 3,000- 14,000
		Costs	$ 0	$ 200	$ 200	$ 200	$ 140	$ 1,900
	Pulp and Paper: Effluent Guidelines	Benefits	$ 0- 160	$ 10- 160	$ 10- 160	$ 10- 160	$ 10- 250	$ 150- 3,400
		Costs	$ 160	$ 160	$ 160	$ 160	$ 250	$ 3,400
	Pulp and Paper: National Emission Standards for Hazardous Air Pollutants (NESHAP)	Benefits	-$ 1,000-1,000	-$1,000-1,000	-$ 1,000- 1,000	-$ 1,000- 1,000	-$ 970- 1,100	-$ 13,000- 14,000
		Costs	$ 80	$ 80	$ 80	$ 80	$ 120	$ 1,600
	National Ambient Air Quality Standards (NAAQS): Ozone	Benefits	$ 0	$ 235- 710	$ 470- 2,500	$ 1,800- 10,000	$ 770- 4,300	$ 11,000- 59,000
		Costs	$ 0	$ 470	$ 1,310	$ 11,000	$ 4,500	$ 62,000
	National Ambient Air Quality Standards (NAAQS): Particulate Matter	Benefits	$ 0	$ 0	$22,000-123,000	$24,000-130,000	$11,000-59,000	$148,000-816,000
		Costs	$ 0	$ 0	$ 10,000	$ 44,000	$ 17,000	$ 230,000

Table 15:
Agency Benefit/Cost Estimates for Final Rules
April 1, 1997 to March 31, 1998
(Millions of 1996$, Rounded to Two Significant Digits)

Agency	Rule	Category	2000	2005	2010	2015	Annualized Value	Net Present Value
	Disposal of Plychlorinated Biphenyls (PCBs)	Benefits	$ 150- 740	$ 150- 740	$ 150- 740	$ 150- 740	$ 160- 790	$ 2,200- 11,000
		Costs	$ 14	$ 14	$ 14	$ 14	$ 14	$ 210

Table 16:
Estimates of the Total Annual Costs and Benefits of Social Regulations by Year, 1995 to March 1998
($ millions)

	2000	2005	2010	2015	Annualized	Net Present Value
1995-96						
Benefits	$ 1,100- 2,300	$ 2,500- 3,900	$ 2,500- 3,900	$ 2,500- 3,900	$ 2,200- 3,600	$ 31,000- 50,000
Costs	$ 1,300- 1,400	$ 1,800- 1,900	$ 1,800- 1,900	$ 1,800- 1,900	$ 1,700- 1,800	$ 23,000- 25,000
1996-97						
Benefits	$13,000-20,000	$13,000-20,000	$13,000- 21,000	$13,000- 22,000	$14,000-22,000	$200,000- 310,000
Costs	$ 2,900- 4,200	$ 2,800- 2,900	$ 2,900- 2,900	$ 2,800- 2,900	$ 3,000- 3,500	$ 42,000- 48,000
1997-98						
Benefits	$ 750- 5,100	$ 1,400- 7,300	$24,000-130,190	$27,000-150,000	$13,000-71,000	$180,000- 990,000
Costs	$ 980	$ 1,600	$ 13,000	$ 56,000	$ 23,000	$ 310,000
Total						
Benefits	$15,000-28,000	$17,000-31,000	$40,000-160,000	$43,000-170,000	$30,000-97,000	$410,000-1,300,000
Costs	$ 5,700- 6,700	$ 6,300- 6,600	$17,000- 17,000	$60,000- 61,000	$27,000-28,000	$380,000- 390,000

TABLE 17: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/95 - 3/31/96
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
USDA	Use of the Term "Fresh" on the Labeling of Raw Poultry Products	Not estimated	$7 million/yr	USDA estimated transfers from producers to consumers of $75 - 125 million/yr due to potential price decreases of $.04 - .10/lb. The qualitative benefits of the rule are that consumers would be assured that poultry products are not labeled in a misleading or false manner.
HHS	Hazard Analysis and Critical Control Points (HACCP): Seafood ("Safe and Sanitary Processing and Importation of Seafood")	$1.44 - 2.56 billion (present value)	$677 million - $1,490 million (present value)	FDA believes that there may be ``re-engineering" types of benefits associated with these regulations. For both seafood and other foods for which HACCP has been implemented, FDA has received information that firms have found cost-saving innovations in other areas as they implement HACCP. These innovations are considered trade secrets by firms and thus, their description (actual process innovations) and quantification is impossible as firms have not released this data into the public domain. This phenomenon involves unexpected savings and efficiencies as a result of establishing a new system in a processing operation. The majority of firms that have previously instituted HACCP reported that they believed that the advantages they derived from HACCP were worth the costs to them in terms of better control over their operations, better sanitation, and greater efficiencies, such as reduced waste. Virtually all foresaw long-term benefits from operating under HACCP.
DOI	Migratory Bird Hunting (Early Season Frameworks)	Not Estimated	Not Estimated	DOI reports that duck hunters spend an estimated $416 million/yr; unquantified economic stimulus benefits derived from spending on duck hunting; unquantified benefit of value to hunters (consumer surplus) from more than 11 million hunting days per year; unquantified benefit to bird population by reducing overcrowding and ensuring continued use of resource in future.

TABLE 17: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/95 - 3/31/96
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
DOI	Migratory Bird Hunting (Late Season Frameworks)	Not Estimated	Not Estimated	DOI reports that duck hunters spend an estimated $416 million/yr; unquantified economic stimulus benefits derived from spending on duck hunting; unquantified benefit of value to hunters (consumer surplus) from more than 11 million hunting days per year; unquantified benefit to bird population by reducing overcrowding and ensuring continued use of resource in future.
DOT	Light Truck CAFE Model-Year 1998	Not Estimated	Not Estimated	None reported
DOT	Head Impact Protection	873 - 1,045 fatalities prevented/yr; 675 - 768 serious head injuries prevented/yr	$640 million/yr	None reported
DOT	Vessel Response Plans	22,000 bbls oil prevented from being spilled/yr	$260 million/yr	The U.S. Coast Guard also stated that there are additional benefits which are not quantifiable. Effectiveness of response operations is enhanced both by the training of citizens and hatchery employees so they may assist in nearshore and onshore operations, and by prepositioning containment and cleanup equipment near where it would be utilized. Also, area drills are expected to improve the proficiency of operations.
EPA	Land Disposal Restrictions Phase III	Not Estimated	$60 - 250 million/yr	Qualitative discussion, including possible reduction in cancer risks

TABLE 17: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/95 - 3/31/96
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
EPA	Marine Tank Vessel Loading and Unloading Operations	40,000 t HC/yr	$60 - 100 million/yr	
EPA	Petroleum Refinery NESHAP	280,000 t HC/yr	$60 million/yr	
EPA	Air Emissions from Municipal Solid Waste Landfills	83,000 t HC/yr; 4,250 Kt methane/yr	$100 million/yr	
EPA	Municipal Waste Combustors	20,000 t SO_2/yr; 3,000 t PM/yr; 20,000 t NO_x/yr; 60 t Hg/yr; 40 kg TCDD TEQ /yr	$320 million/yr	

ABBREVIATIONS: bbls = barrels, CO = carbon monoxide, HC = hydrocarbons, Hg = mercury, kg = kilograms, Kt = kilotons, NO_x = nitrogen oxides, PM = particulate matter, SO_2 = sulfur dioxide, t = tons, TCDD TEQ = 2,3,7,8 tetrachlorodibenzo-p-dioxin toxicity equivalent.

TABLE 17: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/95 - 3/31/96
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
			TRANSFER RULES	
Dept. of Agriculture (USDA)				
	1995 Upland Cotton Program			
	1995 Rice Acreage Reduction Program			
	Disaster Payment Program for 1990 and Subsequent Crops - - Tree Assistance Program			
	1995 Wheat, Feed Grain, and Oilseed Programs			
	General Crop Insurance Regulations (Hybrid Sorghum Seed and Rice)			
	Utility Reimbursement Exclusion			
Dept. of Health and Human Services (HHS)				
	Changes to Hospital Inpatient Prospective Payment System FY 1996			
Dept. of Justice (DOJ)				
	Charging of Fees for Services at Land Border Ports-of-Entry			

TABLE 18: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/96 - 3/31/97
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
USDA	1996 Farm Bill Farm Program	Not Estimated	Not Estimated	"Net farm income (including crop and livestock sectors) during the 1996-2002 calendar years is expected to be about $15 billion higher under the 1996 Act than under the FY 1997 President's Budget baseline. This largely reflects higher Government payments to farmers under the 1996 Act as production flexibility contract payments exceed projected deficiency payments. Additionally, changes in the timing of payments to farmers provide an additional boost to farm income in the first year of the program--pushing 1996 net income up about $4 billion. However, net farm income is up by less than the increase in Government payments due to changes in the dairy and peanut programs. Crop sector receipts are down slightly under the 1996 Act due to lower plantings and production of the eight major commodities. Livestock sector receipts are lower due primarily to lower dairy sector receipts. Cash production expenses are up slightly due to increases in net cash rents, which offset lower crop production expenses from lower plantings. "Farmland values are higher under the 1996 Act compared with the FY 1997 President's Budget, reflecting the capitalized value of higher income. Land values average about 3 percent higher under the 1996 Act compared with FY 1997 President's Budget estimates. "Consumer costs are expected to be only slightly lower under the 1996 Act. Because grain prices, on average, are expected to be essentially unaffected, no appreciable change in grain-based food product costs, such as cereal and meat products, is expected." 61 FR 37544-5. "Alternatively, the 1996 Act can be compared to a 'no program" baseline. Under the 1996 Act, contract commodity payments represent a large portion of the benefits received by producers and there are few planting restrictions. The major differences between a no-program scenario (if the CRP and export programs were continued) and the 1996 Act are that producers would no longer receive contract commodity payments of about $35.9 billion and would no longer be subject to farm conservation and wetland protection requirements. The loss in farm income would likely entail substantial short-term adjustments and financial stress. However, over the longer term, a no-program scenario is expected to have little or no impact on supply, demand, and prices compared with the 1996 Act for most commodities except for peanuts, sugar, and, in the initial years of the period, dairy.

TABLE 18: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/96 - 3/31/97
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
USDA	Conservation Reserve Program	$2 billion/yr, 1997- 2002	$900 million/yr, 1997 - 2002	Other miscellaneous (unquantified) benefits: swimming, boating, wetland conservation, human health impacts, and reduced nutrients in habitats; $5.8 billion/yr in transfers from consumers and taxpayers to farmers.
USDA	Karnal Bunt	Not Estimated	Not Estimated	"This rule is being published on an emergency basis in order to give affected growers the opportunity to make planting decisions for the 1996-97 crop season on a timely basis...This rule may have a significant economic impact on a substantial number of small entities. If we determine this is so, then we will discuss the issues raised by section 604 of the Regulatory Flexibility Act in our Final Regulatory Flexibility Analysis, which we will publish in a future Federal Register." 61 FR 52206.

TABLE 18: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/96 - 3/31/97
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
USDA	Hazard Analysis and Critical Control Points: Meat and Poultry	$0.71-$26.59 billion present value discounted over 20 years	$0.97-1.16 billion present value discounted over 20 years	"The benefits are based on reducing the risk of foodborne illness due to Campylobacter jejuni/coli, Escherichia coli 0157:H7, Listeria monocytogenes and Salmonella. ... these four pathogens are the cause of 1.4 to 4.2 million cases of foodborne illness per year. FSIS has estimated that 90 percent of these cases are caused by contamination occurring at the manufacturing stage that can be addressed by improved process control. This addressable foodborne illness costs society from $0.99 to $3.69 billion, annually. The high and low range occurs because of the current uncertainty in the estimates of the number of cases of foodborne illness and death attributable to the four pathogens. Being without the knowledge to predict the effectiveness of the requirements in the rule to reduce foodborne illness, the Department has calculated projected health benefits for a range of effectiveness levels, where effectiveness refers to the percentage of pathogens eliminated at the manufacturing stage..." 61 FR 38956. "The link between regulatory effectiveness and health benefits is the assumption that a reduction in pathogens leads to a proportional reduction in foodborne illness. FSIS has presented the proportional reduction calculation as a mathematical expression that facilitates the calculation of a quantified benefit estimate for the purposes of this final RIA. FSIS has not viewed proportional reduction as a risk model that would have important underlying assumptions that merit discussion or explanation. For a mathematical expression to be a risk model, it must have some basis or credence in the scientific community. That is not the case here. FSIS has acknowledged that very little is known about the relationship between pathogen levels at the manufacturing stage and dose, i.e., the level of pathogens consumed." 61 FR 38945-6.

TABLE 18: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/96 - 3/31/97
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
DOC	Encryption Items Transferred from the U.S. Munitions List to the Commerce Control List	Not Estimated	$834,000 (govt admin cost FY97), $591,850 (paperwork burden costs)	Unquantified benefits in terms of improved national security, law enforcement and public safety benefits, and economic benefits for industry: "This initiative will support the growth of electronic commerce; increase the security of the global information infrastructure; protect privacy, intellectual property and other valuable information; and sustain the economic competitiveness of U.S. encryption product manufacturers during the transition to a key management infrastructure. 61 FR 68573.
HHS	Food Labeling/ Nutrition Labeling: Small Business Exemption	$275-360 million/yr	$4 million in first year, expected to decline thereafter	None reported.

TABLE 18: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/96 - 3/31/97
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
HHS	Restriction on the Sale and Distribution of Cigarettes and Smokeless Tobacco	$9.2-10.4 billion/yr at 7% discount rate; $28.1-43.2 billion/yr at 3% discount rate	$180 million/yr at 7% discount rate	Unspecified costs of mandatory consumer education program. "These totals do not include the benefits expected from fewer fires (over $160 million annually), reduced passive smoking, or infant death and morbidity associated with mothers' smoking...." "In addition, while FDA could not quantify the benefits that will result from the projected decline in the use of smokeless tobacco, they would be considerable." 61 FR 44396ff.

TABLE 18: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/96 - 3/31/97
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
HHS	Medical Devices: Quality Systems Regulation	$29 million/yr; 44 deaths avoided/yr; 484 to 677 serious injuries avoided/yr;	$82 million/yr	"The medical device industry would gain substantial economic benefits from the proposed changes to the [Comprehensive Good Manufacturing Practices, "CGMP"] regulation in three ways: Cost savings from fewer recalls, productivity gains from improved designs, and efficiency gains for export-oriented manufacturers who would now need to comply with only one set of quality standards. "These estimates of the public health benefits from fewer design-related deaths and serious injuries represent FDA's best projections, given the limitations and uncertainties of the data and assumptions. The above numbers, however, do not capture the quality of life losses to patients who experience less severe injuries than those reported in [medical device recalls, "MDR's"], who experience anxiety as a result of treatment with an unreliable medical device, or who experience inconvenience and additional medical costs because of device failure. "Medical device malfunctions are substantially more numerous than deaths or injuries from device failures and also represent a cost to society. Malfunctions represent a loss of product and an inconvenience to users and/or patients. Additionally, medical device malfunctions burden medical personnel with additional tasks, such as repeating treatments, replacing devices, returning and seeking reimbursement for failed devices, and providing reports on the circumstances of medical device failures. No attempt was made to quantify these additional costs." 61 FR 52602ff.
DOI	Migratory Bird Hunting (Early Season Frameworks)	Not Estimated	Not Estimated	DOI reports that duck hunters spend an estimated $416 million/yr; unquantified economic stimulus benefits derived from spending on duck hunting; unquantified benefit of value to hunters (consumer surplus) from more than 11 million hunting days per year; unquantified benefit to bird population by reducing overcrowding and ensuring continued use of resource in future.

TABLE 18: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/96 - 3/31/97
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
DOI	Migratory Bird Hunting (Late Season Frameworks)	Not Estimated	Not Estimated	DOI reports that duck hunters spend an estimated $416 million/yr; unquantified economic stimulus benefits derived from spending on duck hunting; unquantified benefit of value to hunters (consumer surplus) from more than 11 million hunting days per year; unquantified benefit to bird population by reducing overcrowding and ensuring continued use of resource in future.
DOL	Exposure to Methylene Chloride (MC)	31 cancer cases/yr avoided; 3 deaths/yr avoided from acute central nervous system effects and carboxyhemo-globinemia	$101 million/yr	"MC exposures above the level at which the final rule's STEL is set--125 ppm--are also associated with acute central nervous system effects, such as dizziness, staggered gait, and diminished alertness, all effects that can lead to workplace accidents. OSHA estimates that as many as 30,000 to 54,000 workers will be protected by the final rule's STEL from experiencing CNS effects and episodes of carboxyhemoglobinemia every year. Moreover, exposure to the liquid or vapor forms of MC can lead to eye, skin, and mucous membrane irritation, and these material impairments will also be averted by compliance with the final rule. Finally, contact of the skin with MC can lead to percutaneous absorption and systemic toxicity and thus lead to additional cases of cancer that have not been taken into account in the benefits assessment. " 62 FR 1567-68.
DOT	Airbag Depowering	83-101 fewer fatalities, 5,100 - 8,800 fewer serious injuries over lifetime of one full model-year's vehicles	$0	50 - 431 more fatalities and 171 - 553 more serious/severe chest injuries over lifetime of one full model-year's vehicles; substantial unquantified reduction in minor/moderate injuries.

TABLE 18: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/96 - 3/31/97
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
DOT	Light Truck CAFE Model-Year 1999	Not Estimated	Not Estimated	None reported.
DOT	Roadway Worker Protection	$240 million present value discounted over 10 years	$229 million present value discounted over 10 years	Possible increased capacity of rail lines and improved morale.
EPA	Accidental Release Prevention	$174 million/yr	$97 million/yr	Unspecified value of information made available through disclosure/reporting requirements; efficiency gains, increased technology transfer, indirect cost savings, and increased goodwill; possible damage reductions attributable to offsite consequence analysis and to a reduction in routine emissions.
EPA	Financial Assurance for Municipal Solid Waste Landfills	$105 million/yr	$0	None reported.
EPA	Deposit Control Gasoline	AVG EMISSION REDUCTIONS PER YEAR, 1997-2001: 25,000 t HC, 474,000 t CO, 95,000 t NOx	AVG COST/YR, 1997 - 2000: $138 million/yr	Fuel economy benefits are also expected as a result of the detergent program, amounting to nearly 450 million gallons during the 1995-2001 period. The savings associated with this fuel economy benefit are expected to partially offset the costs of the program. This rule should result in increased sales and business opportunities within the fuel additive industry. EPA anticipates that this program may result in significant vehicle maintenance benefits. However, due to uncertainties in their magnitude, and for other reasons, they were not considered quantitatively in the analysis.

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(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
EPA	Acid Rain Phase II Nitrogen Oxides Emission Controls	EMISSION REDUCTIONS PER YEAR: 890,000 t NOx	$204 million/yr	None reported.
EPA	Federal Test Procedure Revisions	EMISSION REDUCTIONS: In 2005: 30,994 t NMHC 1,937,114 t CO 164,112 t NOx In 2010: 54,892 t NMHC 3,430,769 t CO 290,655 t NOx In 2015: 72,025 t NMHC 4,501,555 t CO 381,372 t NO_x In 2020: 81,977 t NMHC 5,123,565 t CO 434,068 t NOx	$199-245 million/yr	Analysis does not include potential fuel savings of $13.45 discounted over the lifetime of the average vehicle, or about $202 million/yr.

TABLE 18: SUMMARY OF AGENCY ESTIMATES FOR FINAL RULES 4/1/96 - 3/31/97
(As of date of completion of OMB review)

AGENCY	RULE	BENEFITS	COSTS	OTHER INFORMATION
EPA	Voluntary Standards for Light-Duty Vehicles	EMISSION REDUCTIONS (tons/ozone season- weekday): In 2005: 279 t NMOG, 3,756 t CO, 400 t NOx In 2007: 399 t NMOG, 5,302 t CO, 600 t NOx In 2015: 778 t NMOG, 9,723 t CO, 1,249 t NOx	$600 million/yr	None reported.
EPA	Lead-Based Paint Activities in Target Housing	Not Estimated	$1.114 billion present value over 50 years discounted at 3%	Will provide consumers with greater assurance that they will be able to purchase abatement services of reliable quality.

ABBREVIATIONS: CO = carbon monoxide, HC = hydrocarbons, Kt = kilotons, NMHC = non-methane hydrocarbons, NMOG= non-methane organic gases, NOx = nitrogen oxides, t = tons.

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