Tax

the use of Tax Subsidies for the cost of compliance with Safety and Health Regulations

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Office of
Tax Analysis

Department of the Treasury

DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

ASSISTANT SECRETARY

Dear Chairman Dole:

Section 552 of Public Law 95-600, The Revenue Act of 1978, directs the Treasury to make a full and complete investigation of the appropriateness of providing additional tax incentives for expenditures required by the Occupational Safety and Health Act (OSHA) and the Mining Safety and Health Administration (MSHA). The Revenue Act of 1978 further provides that the results of such an investigation be reported to the Committee on Finance of the Senate and the Committee on Ways and Means of the House of Represetatives.

Pursuant to that section, I hereby submit the report entitled "The Use of Tax Subsidies for Costs of Compliance with Occupational Safety and Health Regulations."

I am sending a similar letter to Chairman Rostenkowski of the Committee on Ways and Means of the House of Representatives.

Sincerely,

Emil M. Sunley

Emil M. Sunley
Acting Assistant Secretary
(Tax Policy)

The Honorable
Robert J. Dole
Chairman
Senate Finance Committee
Washington, D.C. 20510

Enclosure

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House Committee on
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Washington, D.C. 20515

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CHAPTER 1

INTRODUCTION AND SUMMARY

In section 552 of Public Law 95-600 (The Revenue Act of 1978) Congress directed the Treasury Department to study the possibility of providing public subsidies to defray the costs associated with government regulation. In particular, Congress asked for a Treasury analysis of the appropriateness of providing preferential tax treatment for expenditures made in order to comply with regulations of the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA). This report is being issued in response to the Congressional directive contained in the Revenue Act of 1978.

I. Evaluation of Tax Subsidies for Compliance

Chapter 2 considers whether a subsidy for compliance costs could be administered fairly and effectively. The experience of the Internal Revenue Service (IRS) with tax subsidies provides valuable insights. The tax law currently provides preferential tax treatment for capital expenditures made in response to EPA requirements. The effort of IRS to

implement Congressional intent has encountered serious problems in defining and identifying EPA-mandated expenditures. These problems result from the need to distinguish expenditures made to comply with EPA guidelines from those made for normal business reasons. Similar difficulties could be expected in administering any subsidy for OSHA/MSHA related costs.

An additional problem in the case of OSHA/MSHA regulations is the need to distinguish gross and net costs of compliance. These regulations may also reduce labor costs to some degree. The benefits of improved health and safety will reduce wage demands by employees and the incidence of accidents and illnesses. The result will be that the net costs imposed on private firms by health and safety regulations will be below the gross compliance costs.

Chapter 2 also considers the economic effects of specific subsidy proposals. The most efficient subsidy would be one that subsidizes net compliance costs of all kinds at the same rate. This avoids the discrimination and misallocations inherent in subsidizing a specific kind of compliance input, e.g., only capital or only labor. Input-specific subsidies will bias production decisions away from the most efficient input mix. Also, compliance subsidies that do not apply across the board will discriminate in the amount of relief they provide to different industries and even to firms in the same industry.

When the tax system is used to make subsidy payments the normal budget and appropriations processes are bypassed. Also, the payments will usually be made in tax-exempt dollars and, as a result, the budgetary measure of revenue loss will understate the true resource costs of the program. This is

because the revenue loss is in tax-exempt dollars whereas resources are valued in markets in before-tax dollars. Furthermore, a tax subsidy program almost always involves higher costs than a direct subsidy program that stimulates the subsidized activity to the same degree. The reason is that some part of the tax loss represents benefits to high-bracket taxpayers in excess of the payments required to accomplish the subsidy objectives.

Special investment tax credits, rapid "write-offs" for certain capital equipment, or the use of tax-exempt bonds to finance the capital equipment required to comply with regulations are particularly inequitable and inefficient. They favor some types of compliance investments relative to others and some industries relative to others.

II. Costs of Regulatory Compliance

A statistical analysis of regulatory compliance costs is presented in Chapter 3. This analysis is based on a unique set of data developed by Arthur Andersen and Company for a report sponsored by the Business Roundtable. 1/

The data illustrate the degree to which variability of costs would present problems of designing and implementing a compliance subsidy. For the 48 companies studied, the cost of EPA regulations amounts to about 60 cents per hundred

1/ Arthur Andersen and Co., Cost of Government Regulation Study, 1979.

dollars of sales. By comparison, the gross cost of OSHA regulation is about 4 cents per hundred dollars of sales. The costs of both types of regulation vary considerably across industries. The mix of compliance costs between capital and other production costs also exhibits substantial variation across industries and between firms in the same industry.

CHAPTER 2

EVALUATION OF TAX SUBSIDIES FOR COMPLIANCE COSTS

I. Introduction

As required by section 552 of the Revenue Act of 1978, this chapter considers and evaluates various methods for subsidizing regulatory compliance costs. Its main findings are that:

- It would be difficult to administer a subsidy for the net costs of complying with OSHA/MSHA regulations.

- A subsidy provided for only the capital costs, but not other costs of compliance, would encourage firms to adopt excessively capital-intensive compliance methods.

- It would be particularly inequitable and inefficient to provide preferential tax treatment -- such as special investment tax credits, accelerated depreciation, and tax-exempt financing -- for the capital costs of compliance.

This chapter considers a number of practical subsidy design issues. The first is whether a subsidy for the net costs of complying with OSHA/MSHA regulations could be administered fairly and effectively, regardless of how it is designed. The experience of the Internal Revenue Service (IRS) with existing tax subsidies provides valuable insights into this issue. The tax law currently provides preferential

tax treatment for capital expenditures made in response to EPA requirements. The efforts of IRS to implement Congressional intent has encountered serious problems in defining and identifying EPA-mandated expenditures. These problems result from the need to distinguish expenditures made to comply with EPA guidelines from those made for normal business reasons. Similar difficulties could be expected in administering any subsidy for OSHA/MSHA related expenses. Section II of this chapter discusses these issues.

One important aspect of subsidy design is defining the base of the subsidy. The principal issues are: (1) whether subsidy payments should be provided for gross compliance costs or for net compliance costs, and (2) whether all or only specific types of compliance expenditures should be subsidized. Section III demonstrates that the most efficient subsidy for OSHA/MSHA related costs would be one that subsidizes net compliance costs of all kinds at the same rate. This avoids the discrimination and misallocations inherent in subsidizing a specific kind of compliance input, e.g., only capital or only labor. Input-specific subsidies will bias production decisions away from the most efficient input mix. Also, compliance subsidies that do not apply across the board will discriminate in the amount of relief they provide to different industries and even to firms in the same industry.

There are also more general problems with tax programs as a vehicle for delivering subsidies. Congressional review of both the operation of the program and its cost is unlikely to occur on a regular basis. Also, if the tax system is used to make the subsidy payments, the payments will usually be made in tax-exempt dollars and in such cases the budgetary measure of revenue loss will understate the true resource costs of the program. This is because the revenue losses will be measured in tax-exempt dollars whereas resources are valued in markets in before-tax dollars.

Tax subsidy programs of the type now available for some EPA-related expenditures -- special investment tax credits, rapid amortization for certain capital equipment, or the use of tax-exempt bonds to finance the capital equipment required to comply with regulations -- are particularly inequitable and inefficient. They favor some types of compliance investment relative to others, some industries relative to others, and also provide more benefits to high-income taxpayers than are necessary to accomplish the subsidy objectives.

II. Administrative Problems with Tax Subsidies for Compliance Costs

It is doubtful whether a tax subsidy program for the net costs of complying with OSHA/MSHA regulations could be administered fairly and effectively. The problems that the IRS has faced in distinguishing eligible costs for a current tax subsidy program illustrate some of the difficulties that could be expected. The specific case is the use of tax-exempt financing for certain EPA-related compliance costs.

A. Experience With An Existing Tax Subsidy For Compliance Cost

Section 103 of the Internal Revenue Code allows State and local governments to issue tax-exempt bonds to finance the purchase of pollution control equipment and solid waste disposal facilities by private firms. 2/ Lenders are willing

2/ Code Section 169 allows another subsidy in the form of 5-year amortization on pollution control equipment installed in plants in existence before December 31, 1976.

to accept a lower rate of interest on tax-exempt than on similarly rated taxable bonds. Thus, borrowing costs are lower for those investments which are financed by tax-exempt debt. In this way, the government can share the costs of acquiring solid waste disposal and pollution control facilities with private sector investors.

Responsibility for administering these tax subsidy programs is divided between EPA and State officials, on the one hand, and IRS officials, on the other. EPA officials may certify that particular investments serve a pollution control or solid waste disposal function. IRS officials decide how much of the investment qualifies for special tax treatment.

The tax subsidies for environmental control facilities are provided by Code sections 103(b)(4)(E and F) enacted in 1968. 3/ More than six years elapsed before temporary regulations were published and some proposed regulations defining eligible facilities have not been finalized. The IRS has been unable to develop administrable procedures for limiting the subsidy to the expenditures that legislators wanted to subsidize.

The legislative history of section 103(b) indicates that the Congress intended to subsidize only those investments specifically undertaken because of EPA mandates. One issue was how to separate the pollution control investments made in response to EPA regulations from those expenditures companies

3/ Prior to 1968, virtually any private enterprise investment, at the discretion of a state or local government authority, could be financed by the issuance of tax-exempt bonds. In 1968, Congress amended Code section 103 to limit the issuance of such bonds. However, among the exemptions from these new restrictions was the financing of "pollution control" and "sewage or solid waste disposal facilities."

would have made in the absence of regulation but which also had the incidental effect of reducing pollution. The more general definitional problem is one of producing regulations which provide the tax subsidy for qualified investments and prevent others from receiving it.

One question that emerged while regulations were being prepared to implement section 103(b) was whether containment devices designed to prevent the discharge of nuclear contaminants into the atmosphere in the event of accidents were eligible for tax-exempt financing. The argument advanced for granting tax subsidies for such investments is that they potentially limit discharges of highly dangerous substances into the environment. However, regulators decided to prohibit tax-exempt financing of such investments because the investments would have been made to protect the public from nuclear accidents even in the absence of any EPA regulations.

For the same reason, nuclear waste was also excluded from the definition of solid waste by Proposed Regulation section 1.103-8(i)(3). Other extremely hazardous materials, such as chemical wastes, were not excluded. When it became clear that this distinction could not be justified, the proposed regulation defining a pollution control facility was modified to reflect the position that no "pollution control" subsidy is appropriate for equipment required for health and safety purposes. The IRS decided that a consistent definition should apply to investments in solid waste disposal facilities eligible for tax-exempt bond financing. The regulators ruled that a material should be excluded from the definition of "solid wastes" if improper handling could cause an immediate risk to the health and safety of the public or the employees of the concern in question.

In attempting to administer the subsidy program in accordance with the wishes of Congress, IRS regulators denied the tax subsidy to investments which both prevented environmental damage and also protected employees from exposure to toxic substances. The reasoning was that employers whose production process involved toxic substances would normally have installed devices to protect their workers as a matter of prudent personnel policy. That is, without such equipment it would not be possible to retain a skilled labor force.

The development of such general criteria for discriminating between qualifying and nonqualifying investments provides some basis for identifying expenditures that would have been made in the absence of EPA regulations. However, skilled administrators are required to implement these criteria in specific cases.

Proposed regulations also limit qualifying "pollution control" expenditures to those for "abating or controlling water or atmosphere pollution or contaminants by removing, altering, disposing, storing, or preventing the creation or emission of pollutants, contaminants, waste, or heat". Thus, in order to qualify for the subsidy, the device installed had to assist in the control of some pollutant actually generated as a result of the industrial process. It is inevitable that such requirements will be adopted by regulators concerned with developing general rules for administering a subsidy for pollution control investments. But since the definition of a pollution control investment will always be arbitrary, it will only be possible to subsidize a limited number of alternative methods of controlling pollution and some methods will always be favored relative to others.

Even if a device meets the criterion of not being required as a part of the normal course of an enterprise's business and does prevent the discharge of "realized pollution", further refinement is needed to determine how much of a particular pollution control expenditure qualifies for tax-exempt financing. Many such expenditures, in addition to controlling pollution, have benefits of the type associated with normal investments. It is necessary, therefore, to develop and apply procedures for separating the part of the capital cost which will produce income in the future from that required to comply with EPA guidelines. 4/ For example, a gas that might have been vented in the absence of some piece of pollution control equipment may undergo additional processing because of pollution control regulations. If the processed gas has value either as an output or an input, to subsidize this processing would clearly be inconsistent with the objective of only subsidizing compliance with environmental regulations. However, in practice it may be difficult to draw a fine distinction between the cost of complying with regulations and the cost of obtaining a usable output because of the joint nature of the process involved.

Similar problems have also been encountered in defining solid waste facilities eligible for tax-exempt financing. One rule developed for making this determination, section 1.103-8(i)(2) of the proposed regulation, provides that "property which further processes, utilizes or reconstitutes material or heat which is no longer solid waste" does not qualify as a solid waste disposal facility if the material or heat has a market value. For example, under Proposed Regulation section 1.103-8(i)(2) equipment which is used to

4/ Conceptually this implies that any profit produced by compliance activities must be used to offset compliance costs.

burn garbage to produce steam would qualify for the subsidy as a disposal facility, but equipment which is used to process the steam once it is in a marketable or useful state (e.g., capable of generating electricity) would not qualify.

This position acknowledges that a facility may operate as an integrated entity, but holds that once the material it processes has an identifiable market value, the equipment no longer processes "waste" and, therefore, does not qualify for a subsidy. A contrary position is that no portion of a facility which disposes of solid waste should be disqualified. The legislative history of Code section 103(b)(4)(E) incorporates and quotes the definition of solid waste found in the Solid Waste Disposal Act at the time the tax subsidies were restricted to environmental control facilities. The legislative history of that Act indicates that the Congressional intent was simply to subsidize the disposal and recycling of solid waste. The draft regulation is consistent with the Congressional intent in that it does not disqualify such facilities from receiving the subsidy, but instead limits the subsidy to equipment which is separately indentifiable as processing solid waste material. However, there are practical problems in precisely delineating and defining a separately identifiable waste control unit.

The proposed regulations initially issued for tax-exempt financing of solid waste facilities defined solid waste as "property which is useless, unused, unwanted or discarded solid material which has no market or other value at the place where it is located." These regulations also defined a qualifying facility to be "any property used for the collection, storage, treatment, utilization, processing, or final disposal of solid waste." [Reg. sect. 1.103-8(f)(2)]. In practice, it has proved difficult to draw the line between normal, profit-making industrial processes -- in which the

residue of one process is then subject to further processing to obtain valuable by-products -- and the processing of "waste." In other words, when is the processing of industrial waste a qualified activity and when does it serve a profit-making function? So far the question is unanswerable. Twelve years after enactment of the subsidy, efforts to develop clarifying regulations continue so that private firms and their bond counsel still face uncertainty about which projects will qualify for the subsidy. The determinations are still made on a case by case basis. 5/

A good example of the range of these definitional problems is presented by the continuing disagreements between the IRS and a soft drink company over whether certain investments are eligible for tax-exempt financing. Some states have prohibited the sale of non-returnable bottles and required substantial deposits on returnable bottles. To comply with these laws, bottling companies have had to make investments in: (1) returnable bottles and (2) warehouses, land, machinery, and equipment for cleaning and refilling the bottles. A number of local governments proposed to issue tax-exempt industrial development bonds to finance these costs and one company requested a ruling that the bonds be declared tax-exempt on the grounds that the investments are for solid waste disposal facilities.

5/ A boiler system to recover useful energy from bark stripped from timber in a forestry-products plant has been ruled by IRS to be a "solid waste" disposal facility qualifying for tax-exempt bond financing. On the other hand, IRS has ruled that a metal shredding machine installed in a junk yard does not qualify.

The major disputed issue is whether returnable bottles are solid waste. At the time section 103(b)(4)(E) was enacted, section 203(4) of the Solid Waste Disposal Act provided that: "The term solid waste means garbage, refuse, and other discarded solid waste materials, including solid waste materials resulting from industrial, commercial, and agricultural operations, and from community activities." According to Regulation section 1.103-8(f) "solid waste" shall "have the same meaning as in section 203(4) of the Solid Waste Disposal Act (42 U.S.C. 3252 (4)), except that for purposes of this paragraph, material will not qualify as solid waste unless, on the date of issue of the obligations issued to provide the facility to dispose of such waste material, it is property which is useless, unused, unwanted, or discarded solid waste material which has no market or other value at the place where it is located. Thus, where any person is willing to purchase such property, at any price, such material is not waste. Where any person is willing to remove such property at his own expense but is not willing to purchase such property at any price, such material is waste." In contesting the IRS regulation, the company argued: (1) the bottles are not valuable for normal market reasons, but instead are valuable because of the deposits established by the state laws and (2) the requirements in the IRS regulations that define waste as material having no value are contrary to the legislative history of the solid waste subsidy.

The Treasury response to this position is that it is unnecessary to decide whether discarded soda bottles are solid waste. For example, manufacturers often make investments to produce longer lasting products. A tire manufacturer may change a production process to produce radial tires rather than conventional ones. Even though discarded tires are solid waste and production of longer-lasting radial tires

is likely to reduce the accumulation of discarded tires, the Treasury contends the production of radial tires does not dispose of solid waste. Using Regulation section 1.103-8(f)(ii), which defines waste disposal broadly to include "collection, storage, treatment, utilization, processing, or final disposal", Treasury personnel made the case that returnable bottle systems are intended to prevent the creation of solid waste and not to dispose of solid waste.

Representatives of the bottling companies have countered that disposal of solid waste is at least one of the major purposes behind the state-mandated requirements to use returnable bottle systems. The IRS issued temporary regulations, which dealt with facilities that dispose of solid waste and that at the same time have other purposes. According to section 17.1 of the temporary regulations the cost of such a facility must be allocated among its several purposes. If, for example, 63 percent of the facility is devoted to the disposal of solid waste, then 63 percent of the cost of the facility can be financed by tax-exempt bonds. The regulations permit the use of any reasonable method of cost allocation. On the basis of this temporary regulation, the IRS position is that returnable bottles serve primarily as containers for beverages and that any secondary function of new bottling plants as facilities for the disposal of solid waste is relatively insignificant.

The focus of the dispute shifted once again with bottling company spokesman pointing out that they already owned facilities for producing soda in non-returnable bottles, that solid waste disposal is the only purpose of any new facilities, and that the new facilities will in no way increase their capacity. One possible response to this position is that the state-mandated requirements which out-

lawed non-returnable bottles have had the effect of reducing the existing productive capacity of non-returnable facilities, since the output from such facilities is no longer marketable. Hence, the new investments in returnable facilities do represent an increase in capacity. Of course, such arguments are unlikely to end the controversy.

The foregoing discussion provides a flavor of the practical problems encountered in administering existing tax subsidy programs for compliance costs. Congress intended the present subsidies to apply only to certain costs incurred to comply with environmental laws. However, experience indicates that finding and implementing a workable distinction between eligible and ineligible costs, for the wide range of conditions encountered, involves considerable effort and defies general solutions.

B. Problems in Identifying OSHA/MSHA Compliance Costs

If Congress decides to provide tax subsidies for OSHA/MSHA-mandated expenditures, similiar problems can be expected. Skilled administrators will be needed to discriminate between safety expenditures required by OSHA/MSHA and those made for normal business reasons. This would apply to all safety expenditures, whether for capital or labor costs. It may be difficult to decide how to allocate the total production cost between the component required by OSHA/MSHA regulations and and the part that contributes directly to ordinary productive activity.

In the case of capital expenditures, the use of safer machines may be expected to reduce other costs of doing business for the company at the same time. For example, a facility installed to protect workers from exposure to toxic

elements can lower labor costs because employees may be able to work longer hours on processes involving toxic materials without danger of being overexposed to them. This is analogous to the waste definition problem -- at some point the further processing of toxic wastes may produce an outcome which is valuable to the firm.

Many of the problems of identifying capital costs mandated by regulations also arise in the case of labor costs. OSHA/MSHA-mandated expenditures entail labor costs, such as time spent by workers learning safety procedures or the use of scientific personnel whose sole or main responsibility is to operate OSHA/MSHA safety equipment. If Congress decides to subsidize these costs, some method of monitoring such labor costs will be needed.

Verifying that particular expenditures are directly attributable to OSHA/MSHA regulations would require on-site inspections. Invoices and evidences of payment, which are satisfactory for auditing deductions of normal business expenses, will not suffice to distinguish inputs required to comply with government regulation from inputs needed for the ordinary processes of production. In order for a compliance cost subsidy program to be administered effectively, technical personnel will be needed who are familiar with both the regulations and the regulated industries.

In calculating the costs of complying with OSHA/MSHA regulations, it should be recognized that these regulations may also reduce market wages. Safer work places may cause wages and other personnel costs arising from illnesses and accidents to be lower than they otherwise would be. In this case, the gross compliance costs of OSHA and MSHA regulations could be offset by lower production costs. Determination of

the net costs of OSHA regulations requires the identification of both gross compliance costs and offsetting reductions in personnel costs. These magnitudes will be difficult to estimate with any precision.

The remaining sections of this chapter analyze alternative methods of providing tax subsidies for the costs of complying with OSHA/MSHA regulations. The next section examines the economic effects of different forms of compliance subsidies. The chapter concludes with a discussion of the effects of particular tax subsidies for capital such as special investment tax credits, tax-exempt bond financing, accelerated depreciation, and expensing.

III. Economic Effect of Compliance Subsidies

Subsidies may be provided for either gross or net compliance costs and may be based on all or only some components of compliance costs. This section illustrates that an efficient subsidy is one that subsidizes all components of net compliance costs.

Suppose, for example, that gross compliance costs per unit of output were $70, composed of operating costs (labor and materials costs) of $40 and capital costs of $30 per unit. Expenditures to increase workplace safety may reduce other production costs to some degree. With a healthier work environment, the cost to employers of providing medical insurance to workers might fall by, say, $20. Training workers in accident prevention techniques could reduce annual capital costs by reducing damages to production equipment by $10. In this example, the gross and the net per-unit costs of mandated safety expenditures would be as depicted in Table 2-1.

Table 2-1

Annual Compliance Costs Per Unit of Output

Component of Compliance Cost	Gross Compliance Cost	Cost Savings to Firm	Net Compliance Cost
Labor	$40	$20	$20
Capital	$30	$10	$20
Total	$70	$30	$40

The numbers in Tables 2-1 illustrate why only net rather than gross compliance costs should be subsidized. If the firm were entitled to receive a subsidy equal to 100 percent of gross compliance costs, it would receive a payment of $70. However, once cost savings are taken into account the actual net compliance burden is only $40. Thus, a 100 percent subsidy of gross compliance costs would over-compensate the firm by $30.

Similar issues arise if compliance with regulations results in the production of a marketable output. For example, compliance activities may generate recycled inputs of value in production. It is also possible that some firms will develop patentable or marketable procedures for complying with existing or new regulations. In these cases, the gross cost of compliance will also overstate the actual compliance burden so that a 100 percent subsidy of gross compliance costs would overcompensate the firm.

A further point is that subsidizing either gross or net capital costs but not labor expenses will encourage firms to substitute capital for labor in complying. Suppose, for example, that only net capital costs are subsidized at 100 percent. Suppose further that the numbers in Table 2-1 represent the least costly way of complying with safety regulations. If only net capital costs were subsidized, the

firm would have an economic incentive to choose a more capital intensive but more costly means of compliance than that depicted in Table 2-1. An example of such an alternative is presented in Table 2-2, where the firm spends $100 rather than $70 for compliance, $80 of which are capital costs, and $20 of which are labor and materials costs.

Table 2-2

Annual Compliance Costs Per Unit of Output

Component of Compliance Costs	Gross Cost of Compliance	Cost Savings to Firm	Net Costs to Society	Subsidy Payments to Firm	Net Costs to Firm
Labor-Materials	$ 20	$ 20	$ 0	$ 0	$ 0
Capital	80	10	70	70	0
Total	100	30	70	70	0

In choosing the alternative shown in Table 2-1, the firm would face net compliance costs of $40 and receive a subsidy of $20 (100 percent of net capital costs). By comparison, in choosing the more costly alternative shown in Table 2-2, the firm would face net compliance costs of $70 and receive a capital cost subsidy of $70. Clearly, the firm would be better off if it chose the compliance alternative shown in Table 2-2. However, society would be worse off because compliance with safety regulations would have been attained at a net cost of $70 rather than $40. This result occurs because the firm's incentive to minimize net capital costs is reduced by the subsidy.

The type of inefficiency described above will vary in severity from firm to firm and from industry to industry depending upon the ease with which capital can be subsituted for labor in attaining compliance. Hence, subsidies based

only on one component of net cost would provide uneven relief from compliance costs and would encourage firms to make economically inefficient responses to regulations.

IV. Structural Problems With Tax Subsidies

Subsidy payments by government can be made in either of two ways. The government can pay a firm directly for making a qualified expenditure. Alternatively, the government can reduce the firm's income tax by an equivalent amount. Either way, the subsidized firm and the government can end up in the same position. Either the firm has the direct cash receipt from the government or it is able to maintain an equivalent cash flow as a result of reduced tax payments. The government has provided a subsidy regardless of whether payment is made directly by cash outlays or indirectly through the tax system. However, there are important differences between these two means of payment. In general, tax subsidies have less desirable administrative and structural characteristics than direct subsidies.

Tax subsidies bypass the normal budget process which provides Congress with an annual opportunity to review the effectiveness of the subsidy. If the subsidy is paid through the tax system there may be no regular Congressional examination of its operation. 6/ Furthermore, tax subsidies are generally open-ended in total amount. Moreover, once enacted, a provision of tax law is not easily changed.

6/ Estimates of the cost of tax subsidies are annually reported as "tax expenditures" in the "Special Analyses" of the annual Budget, by the Congressional Budget Office, and by the Joint Committee on Taxation. However, tax expenditures generally receive less attention than direct outlays in the regular budget processes of the Executive Branch and the Congress. More scrutiny may be given to tax subsidies expiring due to sunset provisions.

A subsidy program requires resources for administration in addition to the costs of the subsidy itself. If the subsidy is paid by the tax system, the IRS must administer the program, usually without additional resources to accomplish this task. It is often difficult to justify additional resources to administer tax provisions that result in collecting less tax revenue.

Tax expenditures are generally made in tax-exempt dollars. Examples currently in the law include percentage depletion allowances, special investment credits, "rapid write-off" of investments in recycling and pollution control equipment, and tax-exempt bond financing of qualified facilities. Making subsidies tax-exempt understates the true cost of the subsidy as illustrated by the following example.

Suppose that Congress decides to subsidize some qualified activity by providing a $10 payment per unit of output that must be included in the taxable income of producers. If the tax rates of these producers are 40 percent, then a $6 subsidy paid in tax-exempt form, would be equivalent to a $10 taxable subsidy. In both cases, the subsidy when combined with payments from consumers would be sufficient to induce producers to expand the subsidized activity. The nominal per unit cost of the subsidy when paid in tax-exempt form, $6, is obviously lower than the $10 paid in taxable dollars. However, the real cost of the subsidy -- the resources attracted to the subsidized activity and away from other production -- is no more with a $10 subsidy taxable payment than with a $6 tax free subsidy payment. Undoubtedly, this systematic understatement of costs encourages the use of tax subsidies.

Moreover, tax subsidy programs almost always involve higher resource costs than direct subsidy programs that stimulate the subsidized activity to the same degree. Taxable subsidy payments stimulate productive activity in the same way as higher revenues from the sale of products in the market. Producers, in both cases, experience an increase in their before-tax returns, and the resulting increase in after-tax returns depends upon their particular marginal tax brackets. In other words, taxable subsidy payments, like income from the sale of goods on the market, provide lower after-tax returns to high bracket than to low bracket taxpayers.

Tax-exempt subsidy payments can be set at a level sufficient to provide the same increase in income after tax as a market payment or a taxable subsidy only to producers in one particular marginal tax bracket. If a producer is in a higher marginal tax bracket than this break-even bracket, tax-exempt payments provide a higher after-tax return than that available from market payments. Thus, if the tax-exempt subsidy is high enough to induce low bracket producers to engage in the subsidized activity, it would provide high income, high bracket taxpayers with a greater after-tax return than they would require from the market. The costs of these higher-than-required payments to high income producers do not arise in the case of taxable subsidies; it is for this reason that tax-exempt subsidies are a less effective and more costly subsidy mechanism.

V. Subsidies for Capital Cost of Compliance

This section considers specific tax subsidies that could be provided for the capital costs of compliance with OSHA/MSHA regulations: special investment credits, tax-exempt financing, rapid amortization, and expensing. In

general, capital subsidies discourage firms from adopting the most efficient ways of complying with regulations by inducing them to substitute capital for labor. The specific tax subsidies discussed below have other undesirable characteristics as well.

A. Special Investment Credits

The present 10 percent investment credit is not equivalent to a 10 percent subsidy for capital costs. First, investors are allowed to claim depreciation deductions on the portion of capital paid by the investment credit. Second, the credit provides a differential subsidy for capital assets depending on their expected lives. Third, the investment credit depends on the firm's having taxable income. Because of these attributes, increasing the investment tax credit for compliance costs would be discriminatory and could lead to inefficiencies in methods of compliance.

1. Effects of Depreciating the Amount of the Subsidy

An investor who claims an investment tax credit is allowed to depreciate the full value of the asset, including the share paid for by the credit. 7/ This provides the

7/ When the investment credit was first introduced in 1962, taxpayers were required to reduce the asset's acquisition price, called the "basis" in tax accounting terminology, by the amount of credit allowable for purposes of computing future tax depreciation allowances. However, because the credit was limited by the tax liability of the taxpayer in the year the asset was acquired, some taxpayers were unable to obtain the benefit of the credit immediately. Nonetheless, the basis for tax depreciation was immediately reduced. This was regarded as unfair and Congress repealed the requirement of a basis adjustment in 1964. However, if the total credit could be claimed immediately regardless of tax liability, a basis adjustment could be required without creating these inequities.

investor with tax deductions in excess of actual costs. The value of these excess deductions increases as the investor's tax rate increases. Thus, the current investment credit discriminates in favor of high income investors.

Table 2-3 presents some calculations of the tax value of depreciation allowances for that portion of the purchase price of assets that is financed by a 10 percent investment credit. The purchase price of each asset is $1,000, thereby generating an investment credit of $100. Depreciation allowances on this $100 are calculated over the useful life using the sum-of-the-years-digits method.

Table 2-3

Present Value of Tax Depreciation Allowed on $100 of Investment Credit 1/

Depreciable Life of the Asset	Tax Rate of Investor	
	40 Percent	50 Percent
6 years 2/	$22.40	$28.70
6 years 3/	$33.55	$43.05
10 years	$29.50	$38.55
15 years	$22.50	$33.90

1/ The streams of depreciation deductions were discounted to present value using the after-tax rate of return for each investor. The before-tax return rate of return is assumed to be 20 percent so that the relevant after-tax returns are 12 percent and 10 percent, respectively, for investors facing a 40 percent tax rate and a 50 percent tax rate.

2/ For this calculation a 6-year asset receives two-thirds of the 10 percent credit.

3/ This calculation would apply if the 6-year asset were allowed the full 10 percent credit.

To compute the amounts in Table 2-3, the present value of depreciation deductions allowed on the subsidized portion of the cost was calculated and the resulting figure multiplied by each investor's tax rate to obtain the value of the tax savings. It is readily seen that for a given asset life, the value of extra deductions is greater the higher the investor's tax rate.

2. Unevenness of Tax Subsidies Across Asset Lives

Allowing investors tax depreciation on the investment credit makes the value of the subsidy dependent on the tax life of the qualified property. For example, if the investor's tax rate were 40 percent, Table 2-3 shows that the tax value of depreciation on a 10 percent credit would be $29.50 for an asset with a $10 year life, but only $22.50 for an asset with a 15 year life. That is, for a given investor tax rate, the investment credit would discriminate against longer-lived assets.

The current structure of rates for the investment credit is a further source of distortion. Currently, if the asset life is less than 3 years, no credit is allowed; if the life is 3 years, but less than 5, a credit of 3-1/3 percent is allowed; if the life is more than 5, but less than 7 years, a credit of 6-2/3 percent is allowed.

3. Tax Liability Limitations

The amount of investment credit that can be taken in any year is limited by the firm's tax liability for the year, although credits in excess of the amount that can be taken in

one year may be carried back three years and forward seven.8/ The limitation imposed by tax liability on the use of tax credits provides an incentive to match activities that generate taxable income with those that create tax credits. Taxpayers unable to use the full amounts of credits earned would seek merger partners or leasing arrangements, two techniques for matching income and tax credits.

B. Tax-exempt Bonds

Another possible subsidy for capital compliance costs is to allow tax-exempt bonds to be issued to finance the acquisition costs of such assets. However, the value of the subsidy implicit in tax-exempt borrowing varies arbitrarily across firms according to their ability to substitute tax-exempt debt for either taxable debt or equity in their balance sheets.

The same reduction in borrowing costs could be provided at lower cost to the government as a direct interest subsidy. Tax-exempt financing is more expensive than a direct subsidy because part of the revenue loss from tax-exempt bonds accrues to the benefit of high-income lenders rather than to borrowers of funds. The spread between tax-exempt and taxable interest rates -- generally on the order of 30 to 35 percent -- indicates the gain to the borrower and also the break-even marginal tax rate at which lenders are indifferent between holding tax-exempt and taxable securities. The

8/ The present annual limitation on investment credit allowed is the first $25,000 of tax liability plus 80 percent of tax liability in excess of $25,000. Under provisions of the Revenue Act of 1978, the 80 percent figure will rise to 90 percent beginning in 1982.

government, however, loses more revenue than this -- perhaps 40 percent or more of the taxable rate -- since purchasers of tax-exempt bonds include many investors in tax brackets above the break-even tax bracket. Thus, the government could provide a direct subsidy of 30 to 35 percent of taxable interest rates at lower cost than permitting the continued use of tax-exempt borrowing.

C. Rapid Amortization of Investments

Rapid amortization of investments allows investors to write-off capital outlays more quickly than the usual rules for tax depreciation. This has the effect of deferring the payment of tax liabilities into the future and is equivalent to an interest-free loan from the government to the investor. For this reason, artificially fast write-offs amount to a capital cost subsidy paid through the tax system.

One common form of rapid amortization is "5-year amortization". Instead of the tax depreciation pattern allowed under the Asset Depreciation Range (ADR) System, an investor may be allowed to write-off the cost of an asset over a shorter period. The gain provided by 5-year amortization depends both on the tax life of the asset and on the tax rate of the investor. The higher the tax rate and the longer the asset's depreciable life under ADR, the greater the value of the deferred taxes, and, therefore, the greater the gain.

Table 2-4 presents illustrative calculations of the tax savings that result from deducting depreciation using 5-year amortization rather than the sum-of-the-years-digits method for assets normally depreciated over 10 years and 15 years. The cost of each asset is again taken to be $1,000. The stream of depreciation deductions was discounted to present value using the after-tax rate of return. The before-tax rate of return is assumed to be 20 percent.

The amounts in Table 2-4 measure the benefit of 5-year amortization over tax depreciation. For a given asset life, these benefits are greater the higher the investor's tax rate. Similarly, for a given tax rate, the benefits of 5-year amortization are higher the longer the depreciable life of the asset.

Table 2-4

Present Value of Tax Savings From
5-Year Amortization for an Asset of $1,000

Depreciable Life of the Asset	Tax Rate of Investor	
	40 Percent	50 Percent
10 years	$ 27.75	$ 21.45
15 years	$ 68.20	$ 78.10

D. Expensing Investments

Expensing is the limiting case of rapid amortization. Expensing permits a capital owner to write off an asset's entire acquisition price in the year in which the asset is purchased. Table 2-5 presents illustrative calculations of the additional tax savings resulting from expensing capital costs rather than deducting those costs using the presently allowable depreciation rules. The values in Table 2-5 are calculated under the same assumptions underlying Tables 2-3 and 2-4.

Table 2-5

Present Value of Additional Tax Savings From Expensing

Depreciable Life of the Asset	Tax Rate of Investor	
	40 Percent	50 Percent
10 years	$108.50	$118.35
15 years	$145.20	$161.15

The tax benefits of expensing increase with the tax life of the investment and with the tax rate of the investor. Moreover, these differential impacts are relatively larger in the case of expensing than for 5-year amortization.

VI. Summary

Subsidies for the net cost of complying with OSHA/MSHA regulations would be extraordinarily difficult to administer. In addition, the use of the tax system to provide compliance subsidies has a number of undesirable consequences:

- Firms are encouraged to adopt compliance methods that are inefficient and excessively capital intensive.
- Tax subsidies bypass the usual budgetary review and control processes of the Congress.
- The true costs of tax subsidies are generally understated.
- Part of the revenue loss is a benefit to high income taxpayers, rather than a subsidy for compliance costs.

CHAPTER 3

COST OF COMPLIANCE WITH OSHA AND EPA REGULATIONS

I. Introduction

This chapter presents quantitative information on regulations and regulatory costs. These data generally confirm the seriousness of the problems discussed in Chapter 2. Most of the material presented here is based on information gathered by Arthur Andersen and Company for the Business Roundtable. 9/ With few exceptions, the Andersen data measure gross, rather than net, compliance costs.

These data demonstrate that gross compliance costs vary substantially across industries and even among firms within the same industry. The division of compliance costs between capital and operating costs also varies significantly across industries and firms. The data also show that costs of compliance are incurred at different times by different firms. Hence, capital subsidies such as tax credits, rapid amortization, or tax-exempt financing provide unequal relief from the burden of government regulations.

9/ A description of the methods and other results is presented in the report entitled Cost of Government Regulation Study published in March 1979 by Arthur Andersen and Company.

Many of the compliance expenditures reported in the Andersen study are difficult to distinguish from expenditures that could have been made for normal business purposes. Identifying the expenditures required by regulations entailed a high level of effort on the part of the Andersen Company and the participating corporations. This suggests that complicated regulations and specialized personnel would be needed to determine what expenditures would qualify for the subsidy payments.

II. Description of the Data

The Arthur Andersen study estimates the incremental costs -- costs in addition to normal production costs--that government regulation imposed on private industry in 1977. The study was limited to the costs imposed by six regulatory agencies--including EPA and OSHA--on 48 large participating companies, covering a wide range of American industry. Determining the incremental costs of regulation required the best judgment of knowledgeable company personnel. Incremental costs of regulation were defined in the study as the costs of a compliance action that would not have been taken in the absence of regulation. The collection of the cost data required 400 staff years of effort devoted to identifying compliance actions, determining the incremental cost of each compliance action identified, and documenting the compliance cost determinations.

Key executives and financial officers of each of the participating companies then reviewed this cost information. After the reviews were completed and the cost estimates internally approved, the data were examined by Arthur Andersen and Company to ensure that all procedures were followed accurately.

The Andersen study made no attempt to evaluate the benefits of regulation to society. The benefits of EPA regulation in terms of cleaner air and water are not subtracted from the compliance costs. Some compliance actions provide benefits to firms in the form of recoverable products. The Andersen study adjusted for such benefits when they could be determined from engineering and accounting records. No attempt was made, however, to adjust for reductions in personnel costs resulting from regulations that improve safety. Thus, the Andersen study measured the gross costs of complying with OSHA regulations.

Table 3-1 presents data on the 48 companies participating in the Business Roundtable study in relation to all U.S. companies in the same industry. Sales, capital expenditures, and the number of employees of the participating companies by industry as well as similar data for all U.S. companies are shown. As indicated by the last column of the table, sales of participating companies range from one percent of industry sales for Wholesale Trade to 71 percent for Communications.

Total capital expenditures required to comply with mandates of regulatory agencies are often confused with the annual costs of using the capital required for compliance. Annual capital costs are usually a much lower figure, since the compliance equipment may last for several years. To compare capital costs with labor costs, this study annualized the information on capital expenditures. The method used to accomplish this adjustment is explained in Appendix B.

Table 3-1

Sales, Capital Expenditures and Employment of Participating Companies as Compared to All Companies in the U.S. in 1977

Industry Description	Participating Companies in Industry			All U.S. Companies in Industry			Sales of Participating Companies as a Percent of Sales of All U.S. Companies in Industry (Percent)
	Sales ($000,000)	Capital Expenditures ($000,000)	Number of Employees (000)	Sales ($000,000)	Capital Expenditures ($000,000)	Number of Employees (000)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Forestry	771	97	4	NA	NA	NA	NA
Bituminous Coal and Lignite	223	93	3	17,020	[4,500] 1/	218	1
Other Mining	327	75	4	14,619		209	2
Food and Kindred Products	9,403	198	58	191,887	4,180	1,720	5
Lumber and Wood Products	4,401	193	39	NA	1,240	642	NA
Paper and Allied Products	4,654	522	57	52,368	3,360	699	9
Chemical and Allied Products	23,907	2,836	260	113,891	6,830	1,058	21
Oil and Gas	20,316	2,498	66	141,039	13,870	614	14
Rubber and Miscellaneous Products	4,934	225	86	36,955	1,450	675	13
Stone, Clay, Glass and Concrete	2,888	175	50	35,274	1,990	652	8
Primary Metal Industries	9,053	718	127	103,340	5,680	1,204	9
Fabricated Metal Products	1,237	48	28	85,255	2,290	1,452	1
Machinery Except Electrical	15,871	1,820	307	119,008	5,760	2,187	13
Electrical Machinery	20,727	700	408	85,759	3,280	1,936	24
Transportation Equipment	51,352	3,157	637	170,739	5,320	1,797	30
Instruments	4,020	289	75	28,570	1,190	527	14
Railroad, Freight and Water Trans.	2,126	291	48	33,969	5,310	1,628	6
Communication	29,403	11,047	805	41,309	15,450	1,167	71
Electric and Gas Services	3,110	429	18	62,610	25,800	745	5
Wholesale Trade	3,426	37	11	642,104	330	4,389	1
Banking	9,922	211	87	90,069	NA	1,342	11

NA Not Available

1/ Combined capital expenditures for U.S. companies in Other Mining, Bituminous Coal and Lignite, and Oil and Gas Extraction Industries.

Source: Report provided to the Office of Tax Analysis by Arthur Andersen & Co. under Treasury Contract OAP 79-43.

III. Statistical Findings

A. Variations in Compliance Costs

Table 3-2 illustrates the importance of three types of cost variations that will pose problems for subsidy design. First, regulations have a differential cost impact on different industries. Second, industries do not attain compliance with regulations at the same time. Third, capital costs vary as a share of total cost.

Columns (1) and (4) present compliance cost as a percentage of sales for OSHA and EPA regulations respectively. The costs of complying with EPA regulations range from 3.10 percent of sales for Electric and Gas Services to less than 0.01 percent of sales for Communication and Wholesale Trade. Complying with EPA regulations costs more than complying with OSHA regulations. The cost of complying with OSHA regulations varied from 0.14 percent of sales in the Chemical and Allied Products industry to less than 0.01 percent in several industries including -- Forestry; Railroad, Freight and Water Transportation; Communication; and Wholesale Trade.

Columns (2) and (5) illustrate why timing considerations present an important subsidy design problem. For projects in progress in 1977, data were available on capital expenditures made before 1977, during 1977, and those planned for future years. Planned expenditures as a percentage of total expenditures on these projects vary substantially by industry. For example, according to column 5, Chemical and Allied Products companies would make 57.4 percent of their capital expenditures to comply with OSHA regulations in the post-1977 period, whereas Primary Metals companies would make only 31.1 percent of such expenditures after-1977. Thus, Chemical

Table 3-2

Comparisons of Compliance Costs for Participating Companies

Industry	EPA Regulations			OHSA Regulations		
	Compliance Cost as a Percent of Sales	Post-1977 Capital Expenditures as a Percent of Total Capital Expenditures	Annual Cost of Capital as a Percent of Total Annual Compliance Cost	Compliance Cost as a Percent of Sales	Post-1977 Capital Expenditures as a Percent of Total Capital Expenditures	Annual Cost of Capital as a Percent of Total Annual Compliance Cost
	(1)	(2)	(3)	(4)	(5)	(6)
Forestry	.01 %	0.0 %	92.2 %	*	*	100.0 %
Bituminous Coal & Lignite	.07	0.0	100.0	NA	NA	NA
Other Mining	.32	4.4	85.3	NA	NA	NA
Food & Kindred Products	.03	57.8	75.8	.01 %	18.6 %	95.8
Lumber & Wood Products	.74	27.1	83.1	.01	26.5	96.5
Paper & Allied Products	1.41	42.6	72.3	.02	37.9	96.8
Chemical & Allied Products	1.85	33.6	75.0	.14	57.4	83.4
Oil & Gas	1.21	14.3	81.8	.02	20.9	91.1
Rubber & Misc. Products	.18	46.4	76.8	.09	32.4	84.3
Stone/Clay/Glass & Concrete	.33	32.7	70.4	.02	20.2	90.9
Primary Metal Industries	1.82	32.2	75.0	.09	31.1	70.9
Fabricated Metal Products	.15	38.1	68.4	.04	14.2	94.8
Machinery Except Electrical	.16	34.1	85.0	.02	16.6	93.7
Electrical Machinery	.08	33.9	83.5	.09	54.5	85.1
Transportation Equipment	.11	50.9	99.2	.03	16.5	92.1
Instruments	.34	13.8	64.0	.01	21.4	81.1
Railroad/Freight/Water Trans.	.09	23.8	78.7	*	6.3	65.6
Communication	*	80.2	71.7	*	4.8	99.8
Electric & Gas Services	3.10	55.4	81.4	*	2.7	100.0
Wholesale Trade	*	0.0	100.0	*	0.0	100.0
Banking	NA	NA	NA	*	0.0	93.2
All Participating Companies	.56	32.9	78.3	.04	45.7	84.0

* Less than .005 percent.

NA Not Available

Source: Report provided to the Office of Tax Analysis by Arthur Andersen & Co. under Treasury contract OAP 79-43.

companies would receive relatively more relief from compliance costs than the Primary Metals companies if a subsidy were only for capital expenditures in the post-1977 period.

The timing of a subsidy program is an important consideration if the subsidy is to be equitable in the sense of providing the same benefits to similarly situated firms. The best time to put the program in place is when the regulations are being introduced or tightened. For example, if Congress decided to institute a 10 percent capital grant as a subsidy for EPA compliance costs in the post-1977 period, the subsidy would cover 8 percent of the total capital expenditures required for compliance in the Communication industry and none of those expenditures in the Forestry industry.

The division of total compliance costs between capital costs and operating expenses also varies considerably from industry to industry for a given regulation. This variation is illustrated by the data in columns (3) and (6) of Table 3-2. Column (3) shows that the share of capital cost in total EPA compliance cost ranges from 100 percent in Wholesale Trade to 64.0 percent for Instruments. For OSHA regulations, Column (6) of Table 3-2 indicates that capital costs account for 100 percent of total annual costs of complying with OSHA regulations in Forestry, 83.4 percent in Chemical and Allied Products, and 65.6 percent in Railroad, Freight and Water Transportation. A 10 percent capital subsidy, if it applied only to capital costs and yet did not bias compliance towards capital intensive methods would reduce compliance costs by 10 percent in some industries and as little as 6.4 percent in the case of Instruments manufacturing. More detailed information regarding the percentages in Table 3-2 are given in Appendix A.

B. Specific Cases of Cost Variation

This section demonstrates that the variability in total compliance costs among industries remains as the regulation category becomes more narrowly defined. The following three case studies of regulation examine the costs imposed on particular industries by the EPA water pollution regulations, the OSHA toxic and hazardous substances regulations, and the OSHA occupational health and environmental control regulations.

1. Variation Among Industries in the Cost of Compliance with Particular Regulations

The first set of regulations examined are EPA water treatment regulations. These regulations establish effluent limitations by industry and are implemented by means of contracts between government agencies and private firms.

Table 3-3 shows the costs of EPA water treatment regulations in Chemical and Allied Products and in Primary Metals. As indicated by the first column, complying with the water treatment regulations cost firms in the Chemical industry over twice as much per dollar of sales as firms in the Primary Metals industry. Also, a subsidy for capital costs introduced in the post-1977 period would provide relatively more relief to Chemical companies because a larger proportion of its capital expenditures were made in that period. Since the share of capital costs in total compliance costs is higher in the Primary Metals industry, a capital subsidy for compliance costs would provide more relief per dollar of compliance cost to Primary Metals than to Chemicals.

Tables 3-4 and 3-5 present similar cost information regarding OSHA regulations for toxic and hazardous substances and for occupational health and environmental control. The

Table 3-3

Costs of Compliance with EPA Water Treatment Regulations, Selected Industries

Industry	Total Compliance Costs Per Thousand Dollars of Sales	Post-1977 Capital Expenditures as a Percent of Total Capital Expenditures	Capital Costs as Percent of Total Compliance Costs
Chemical & Allied Products	$ 4.95	26.9 %	64.9 %
Primary Metals	1.95	15.2	71.0

Table 3-4

Costs of Compliance with OSHA Toxic and Hazardous Substances Regulations, Selected Industries

Industry	Total Compliance Costs Per Thousand Dollars of Sales	Post-1977 Capital Expenditures as a Percent of Total Capital Expenditures	Capital Costs as Percent of Total Compliance Costs
Chemical & Allied Products	$ 0.14	58.4 %	82.6 %
Primary Metals	0.03	64.2	56.0
Electrical Machinery	0.06	55.9	90.5

Table 3-5

Costs of Compliance with OSHA Occupational Health and Environmental Control Regulations, Selected Industries

Industry	Total Compliance Costs Per Thousand Dollars of Sales	Post-1977 Capital Expenditures as a Percent of Total Capital Expenditures	Capital Costs as Percent of Total Compliance Costs
Chemical & Allied Products	$ 0.21	60.6 %	97.7 %
Primary Metals	*	6.3	100.0
Electrical Machinery	0.09	5.8	85.5

* Less than .005

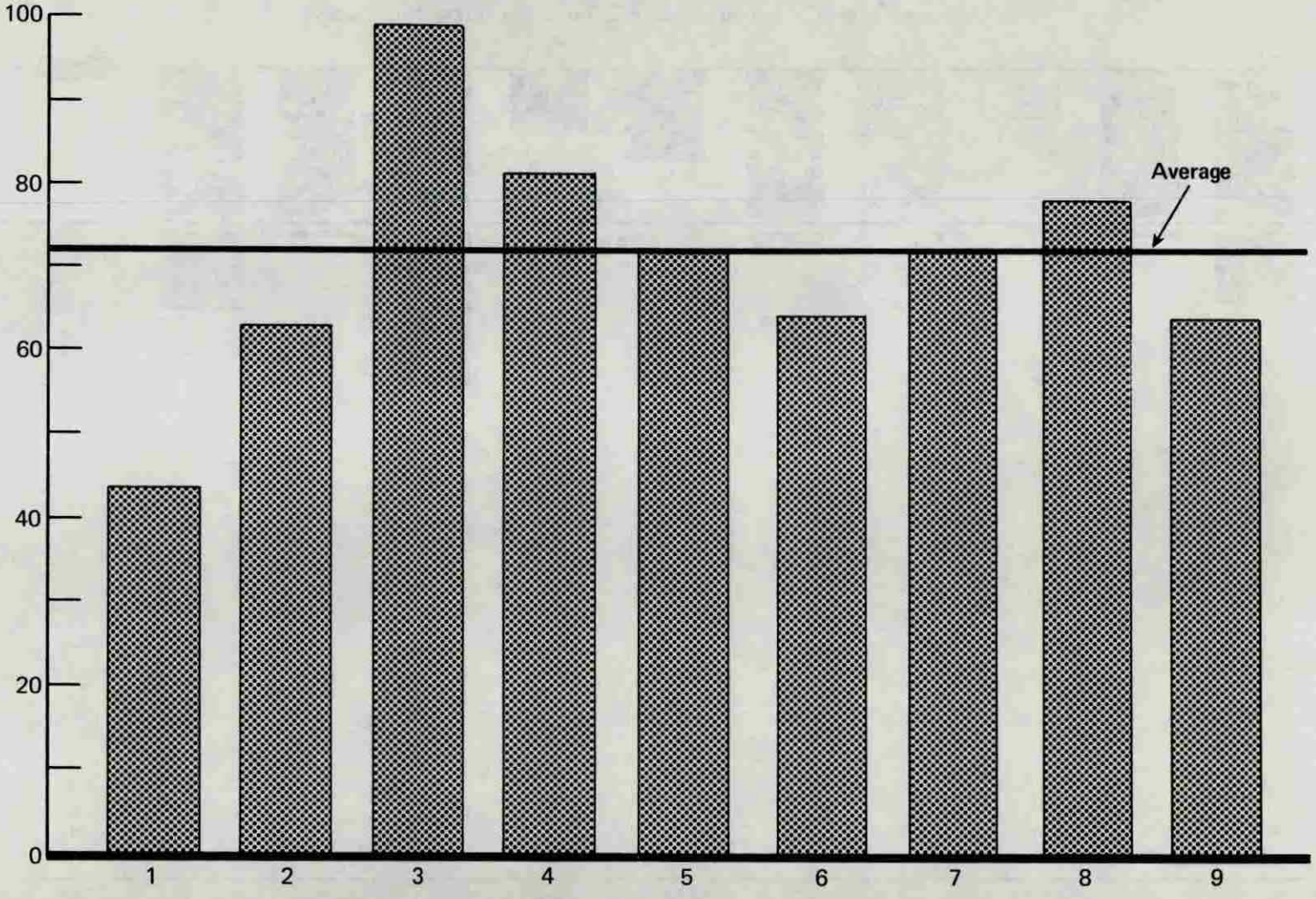
toxic and hazardous substances regulations are designed to reduce worker exposure to a number of substances that are potential hazards to human health. The occupational health and environmental costs of regulations are designed to reduce worker exposure to excessive noise, fumes, and other health risks. The data generally reinforce the previous finding that variations in the size, timing and components of compliance cost are substantial even for a specific regulation.

2. Variation in Capital Cost at the Firm Level

Figure 3-1 shows how the share of capital cost in total cost varies for EPA water treatment regulations among nine selected firms in the Chemical and Allied Products industry. Total compliance costs increase from left to right in the chart. Capital costs as a share of total costs range from 42 percent in the first company to 94 percent in the third company. The average capital cost share is 72 percent. One company is below this average by 30 percentage points and another is above it by 22 percentage points. So a subsidy for capital cost of compliance would provide uneven assistance to firms in the same industry.

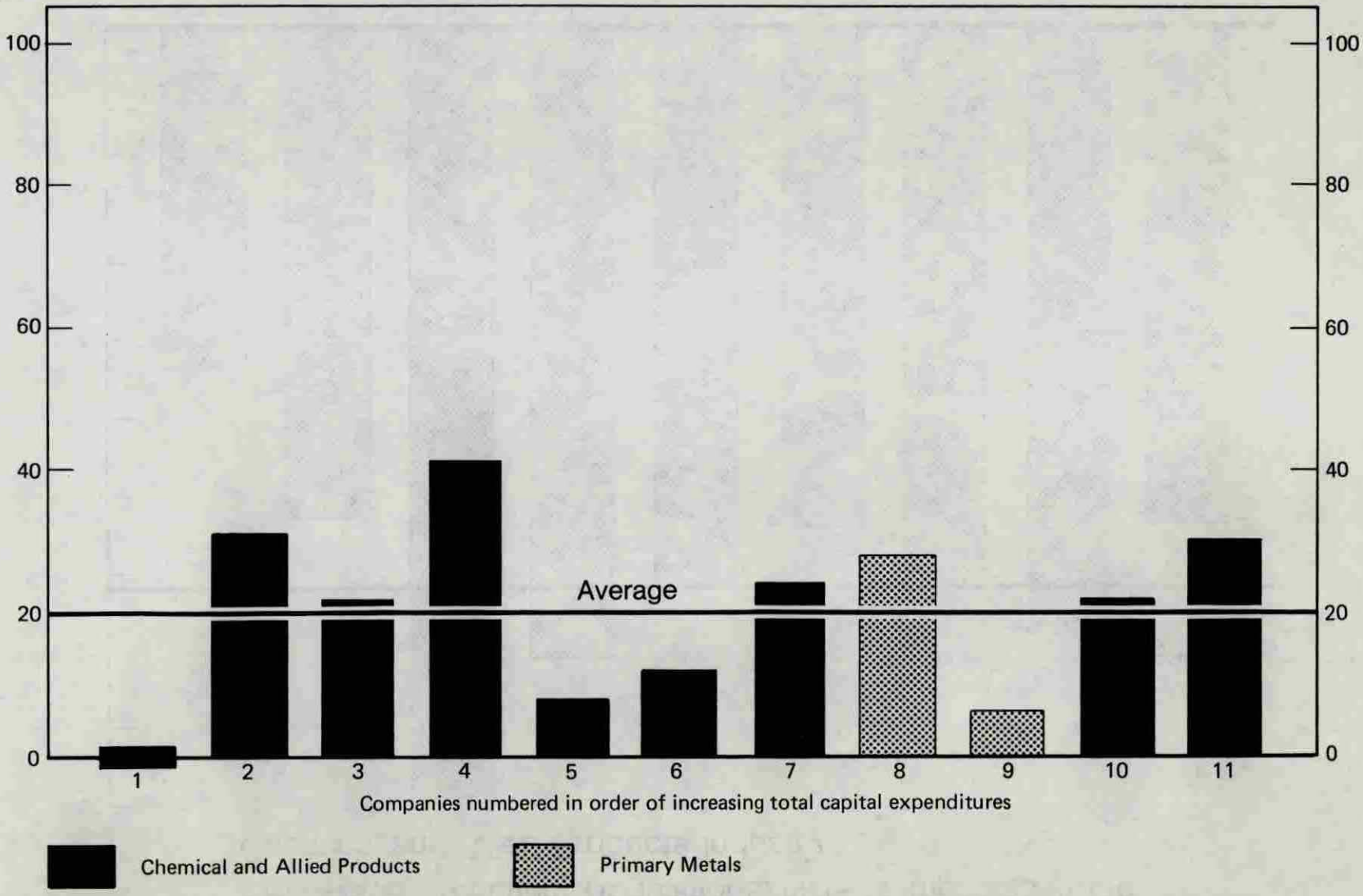
Figure 3-2 shows that the timing of a subsidy can be important for firms in the same industry. This is illustrated here by EPA water treatment regulations. The companies represented in the chart are ranked in order of total capital expenditures undertaken to comply with these regulations. The bars in Figure 3-2 indicate the shares of post-1977 capital expenditures in total capital expenditures. On average, the companies made 20 percent of their total capital expenditures in the post-1977 period. There was, however, considerable variability around the 20 percent average. For example, the fourth Chemical company made 40 percent of its capital expenditures in the post-1977 period.

Figure 3-1 Capital Costs as a Percent of Total Cost of Compliance with EPA Water Treatment Regulations, Nine Companies in the Chemical and Allied Products Industry.*



* Data are adapted from the Arthur Andersen & Co. Cost of Government Regulation Study sponsored by The Business Roundtable.

Figure 3-2 Post 1977 Capital Expenditures as a Percent of Total Capital Expenditures for Compliance with EPA Water Treatment Regulations, Eleven Companies.*



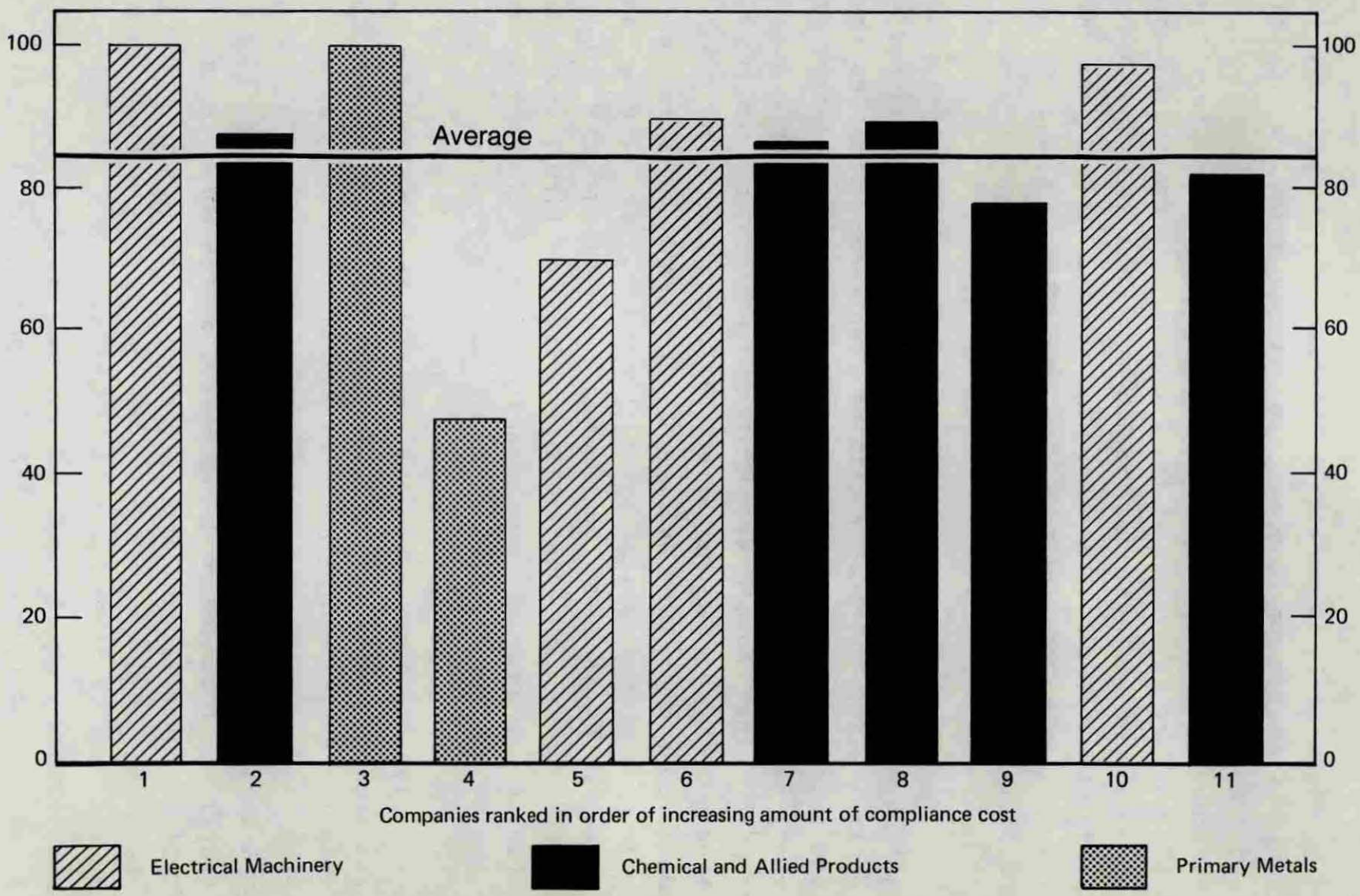
*Data are adapted from the Arthur Andersen & Co., Cost of Government Regulation Study sponsored by the Business Roundtable.

Figure 3-3 illustrates the degree of variability in the composition of compliance costs between firms, both within and across industries, in complying with the OSHA toxic and hazardous substances regulations. Figure 3-3 portrays capital costs as a percent of total costs for companies in three industries: Electrical Machinery, Chemical and Allied Products, and Primary Metals. The average capital cost share is 83 percent of total cost. Two firms (4 and 5) have capital cost shares that are well below this average.

Figure 3-4 shows that if a compliance cost subsidy were introduced in the post-1977 period, it would provide differential relief to firms attaining compliance with OSHA toxic and hazardous substances regulations at different times. The chart indicates that on the average firms made over 40 percent of the capital expenditures required to comply with these OSHA regulations after 1977, but there were marked deviations from this average. For example, firms 1 and 2 made none of the capital expenditures required for compliance after 1977, whereas firm 6 made over 90 percent of its expenditures in the post-1977 period. Thus firm 6 would have obtained disproportionate benefits from a compliance cost subsidy program established in the post-1977 period.

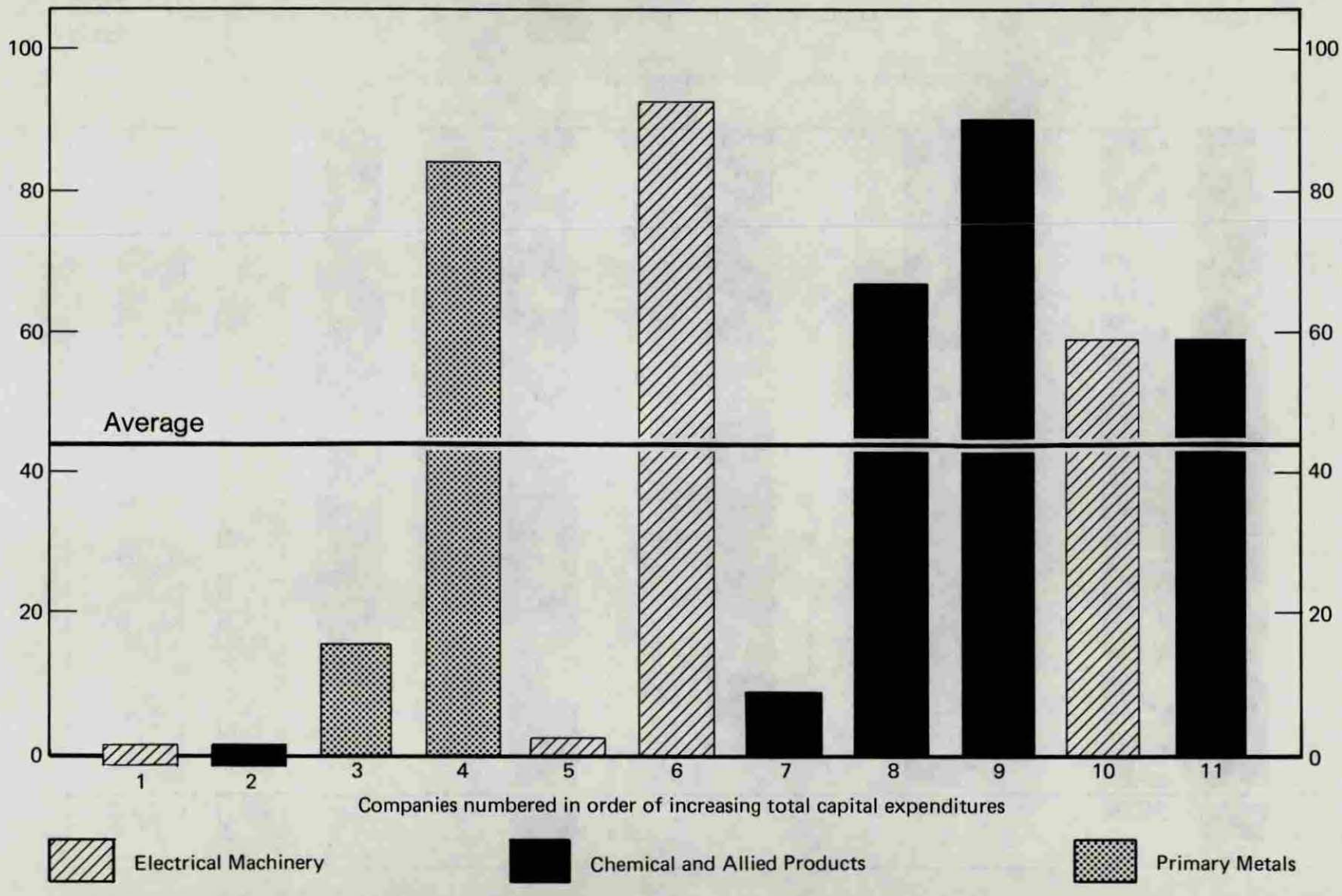
Figure 3-5 indicates the capital intensity of processes required to comply with OSHA occupational safety and environmental control regulations. On average, the share of capital costs in total cost for the 12 companies exceeded 90 percent. However, there is some variation in the composition of compliance costs among firms in two of the three industries. Capital costs account for 80 percent of the total costs for one chemical company (bar 3) and 100 percent for two others (bars 5 and 12). In Electrical Machinery, capital costs were about 85 percent of the total for two of the companies (bars 8 and 10) and 100 percent for the others (bars 2 and 6).

Figure 3-3 Capital Cost as a Percent of Total Cost of Compliance with OSHA Toxic and Hazardous Substances Regulations, Eleven Companies.*



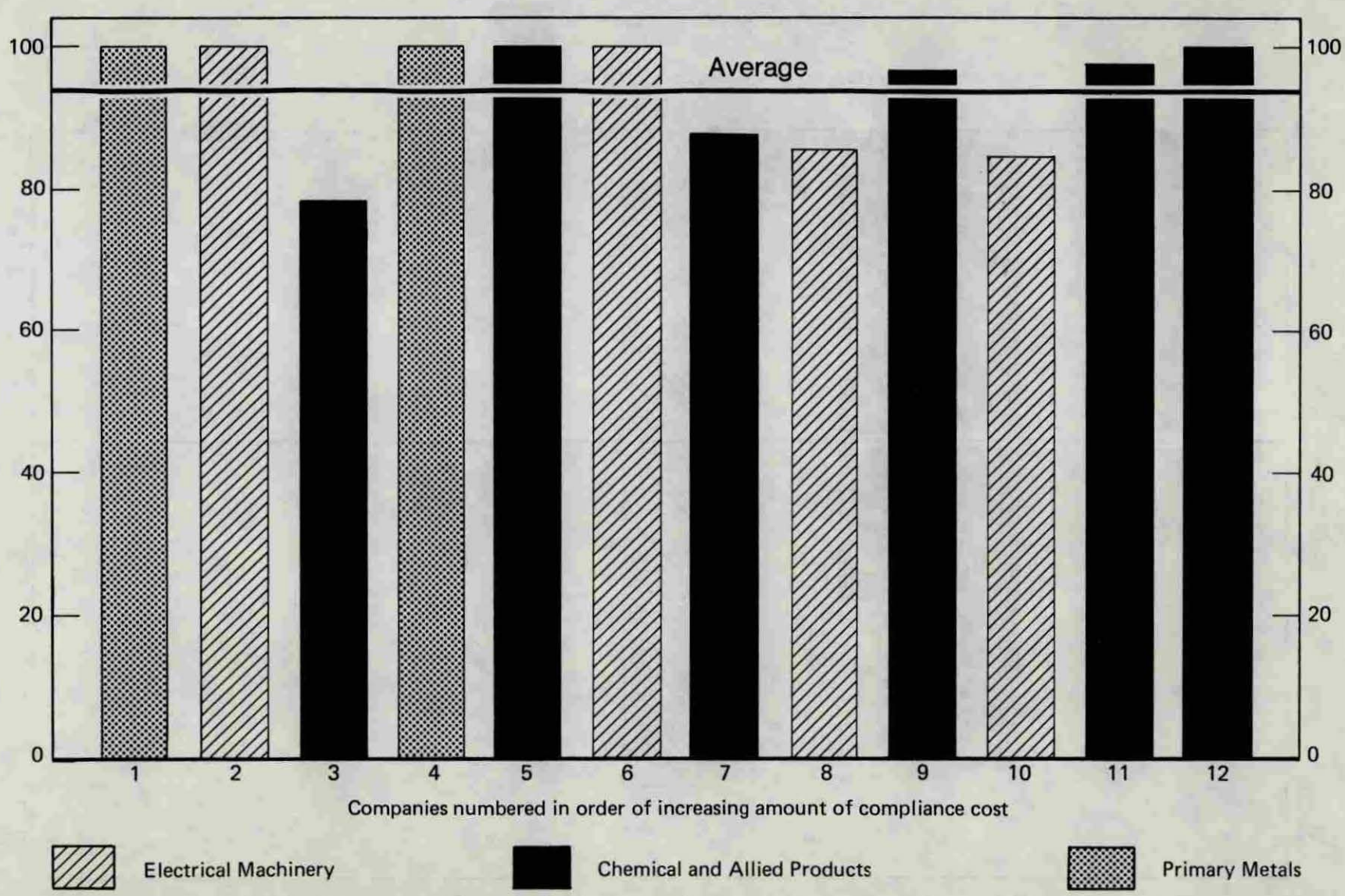
*Data are adapted from Arthur Andersen & Co., Cost of Government Regulation Study sponsored by the Business Roundtable.

Figure 3-4 Post-1977 Capital Expenditures as a Percent of Total Capital Expenditures for Compliance with OSHA Toxic and Hazardous Substances Regulations, Eleven Companies.*



* Data are adapted from the Arthur Andersen & Co., Cost of Government Regulation Study sponsored by the Business Roundtable.

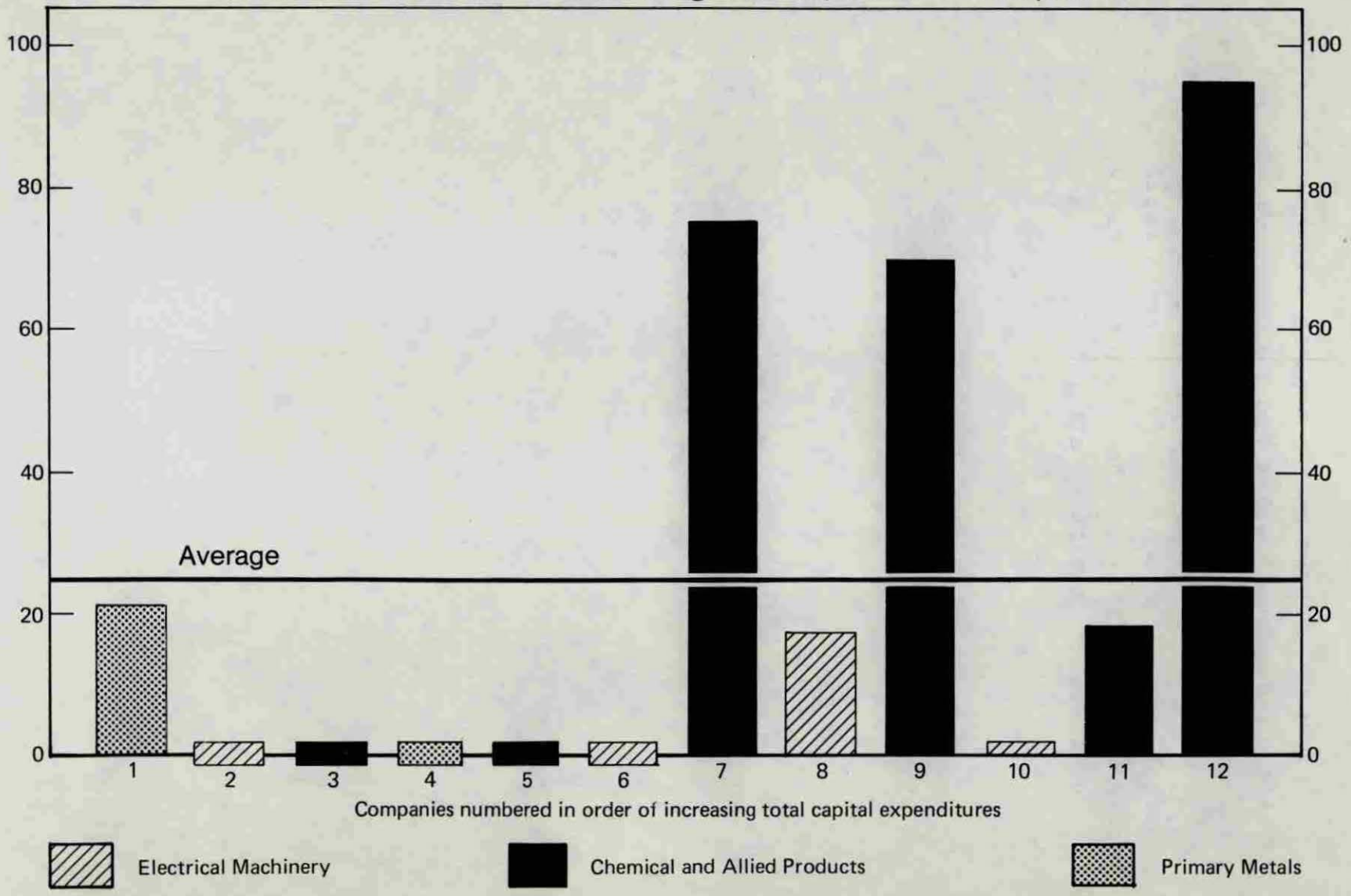
Figure 3-5 Capital Cost as a Percent of Total Cost of Compliance with OSHA Occupational Safety and Health Regulations, Twelve Companies.*



*Data are adapted from Arthur Andersen & Co., Cost of Government Regulation Study sponsored by the Business Roundtable.

Figure 3-6 shows that companies attained compliance with OSHA's occupational health and environmental control regulations at different times. The company represented by bar 12, a Chemical company, made over 90 percent of its required capital expenditures after 1977, whereas those represented by bars 3 and 5, also in the Chemical industry, made none of their capital expenditures after 1977.

Figure 3-6 Post-1977 Capital Expenditures as a Percent of Total Capital Expenditures for Compliance with OSHA Occupational Health and Environmental Control Regulations, Twelve Companies.*



* Data are adapted from the Arthur Andersen & Co., Cost of Government Regualtion Study sponsored by the Business Roundtable.

APPENDIX A

Tables of Compliance Cost Comparisons by Industry and Type of Regulation

Table A-1

Compliance Cost as Compared to Sales for Participating Companies

Industry Description	Sales ($000,000)	For Participating Companies in Industry Group: EPA Regulations: Total Compliance Cost ($000)	EPA Regulations: Compliance Cost Per Dollar of Sales ($)	OSHA Regulations: Total Compliance Cost ($000)	OSHA Regulations: Compliance Cost Per Dollar of Sales ($)
	[1]	[2]	[3]	[4]	[5]
Forestry	771	103	.0001	6	*
Bituminous Coal and Lignite	223	153	.0007	NA	NA
Other Mining	327	1,054	.0032	NA	NA
Food and Kindred Products	9,403	2,855	.0003	997	.0001
Lumber and Wood Products	4,401	32,564	.0074	227	.0001
Paper and Allied Products	4,654	65,757	.0141	744	.0002
Chemical and Allied Products	23,907	441,160	.0185	34,133	.0014
Oil and Gas	20,316	245,438	.0121	3,162	.0002
Rubber and Miscellaneous Products	4,934	8,752	.0018	4,414	.0009
Stone, Clay, Glass and Concrete	2,888	9,607	.0033	617	.0002
Primary Metal Industries	9,053	164,330	.0182	7,747	.0009
Fabricated Metal Products	1,237	1,809	.0015	539	.0004
Machinery Except Electrical	15,871	24,898	.0016	3,016	.0002
Electrical Machinery	20,727	15,902	.0008	18,051	.0009
Transportation Equipment	51,352 1/	56,743	.0011	1,143	.0003
Instruments	4,020	13,785	.0034	465	.0001
Railroad Freight and Water Trans.	2,126	1,973	.0009	61	*
Communication	29,403	778	*	594	*
Electric and Gas Services	3,110	96,496	.0310	64	*
Wholesale Trade	3,426	6	*	3	*
Banking	9,922	NA	NA	59	*
TOTAL	222,071	1,184,163	.0056 2/	76,042	.0004 3/

* Less than .005 percent.

NA Not available.

1/ All participating companies did not report OSHA costs. Those reporting OSHA costs had sales of $3,801 million.
2/ Obtained by dividing total EPA compliance costs by the sales of companies reporting EPA costs.
3/ Obtained by dividing total OSHA compliance costs by the sales of companies reporting OSHA costs.

Source: Report provided to Office of Tax Analysis by Arthur Andersen & Co. under Treasury contract OAP 79-43.

Table A-2

Timing of Total Capital Expenditures Required for Compliance with EPA Regulations, Participating Companies

Industry	Total Capital Expenditures for Compliance				Post-1977 Capital Expenditures as a Percent of Total
	Pre-1977 ($000)	1977 ($000)	Post-1977 ($000)	Total ($000)	
	(1)	(2)	(3)	(4)	(5)
Forestry	0	272	0	272	0.0 %
Bituminous Coal and Lignite	0	460	0	460	0.0
Other Mining	759	1,822	120	2,701	4.4
Food and Kindred Products	1,415	1,479	3,963	6,857	57.8
Lumber and Wood Products	38,110	16,955	20,502	75,567	27.1
Paper and Allied Products	42,321	51,838	69,880	164,039	42.6
Chemical and Allied Products	368,807	292,116	334,039	994,962	33.6
Oil and Gas	537,535	92,669	105,293	735,497	14.3
Rubber and Miscellaneous Products	6,921	5,161	10,439	22,521	46.4
Stone, Clay, Glass and Concrete Products	6,267	9,418	7,632	23,317	32.7
Primary Metal Industries	171,951	133,443	145,307	450,701	32.2
Fabricated Metal Products	1,545	409	1,201	3,155	38.1
Machinery Except Electrical	23,754	18,145	21,676	63,575	34.1
Electrical Machinery	14,691	11,673	13,542	39,906	33.9
Transportation Equipment	12,874	66,136	81,978	160,988	50.9
Instruments	21,995	4,233	4,206	30,434	13.8
Railroad, Freight and Water Transportation	2,197	1,106	1,032	4,335	23.8
Communication	48	398	1,810	2,256	80.2
Electric and Gas Services	110,473	53,937	203,833	368,243	55.4
Wholesale Trade	0	16	0	16	0.0

Source: Report provided to the Office of Tax Analysis by Arthur Andersen & Co. under Treasury contract OAP 79-43.

Table A-3

Timing of Total Capital Expenditures Required for Compliance with OSHA Regulations, Participating Companies

Industry	Total Capital Expenditures for Compliance				Post-1977 Capital Expenditures as a Percent of Total
	Pre-1977 ($000)	1977 ($000)	Post-1977 ($000)	Total ($000)	
	(1)	(2)	(3)	(4)	(5)
Forestry	$ 0	$ 18	$ 0	$ 18	0.0%
Food and Kindred Products	800	1,663	564	3,027	18.6
Lumber and Wood Products	48	402	162	612	26.5
Paper and Allied Products	188	1,353	941	2,482	37.9
Chemical and Allied Products	11,770	24,690	49,067	85,527	57.4
Oil and Gas	5,604	2,745	2,210	10,559	20.9
Rubber and Miscellaneous Products	3,512	4,914	4,040	12,466	32.4
Stone, Clay, Glass and Concrete Products	257	1,287	391	1,935	20.2
Primary Metal Industries	9,793	4,081	6,248	20,122	31.1
Fabricated Metal Products	180	936	185	1,301	14.2
Machinery Except Electrical	845	6,239	1,408	8,492	16.6
Electrical Machinery	7,692	13,326	25,175	46,193	54.5
Transportation Equipment	239	2,273	497	3,009	16.5
Instruments	114	907	278	1,299	21.4
Railroad, Freight, and Water Transportation	31	73	7	111	6.3
Communication	40	2,243	116	2,399	4.8
Electric and Gas Services	0	292	8	300	2.7
Wholesale Trade	0	8	0	8	0.0
Banking	0	158	0	158	0.0

Source: Report provided to the Office of Tax Analysis by Arthur Andersen & Co. under Treasury contract OAP 79-43.

Table A-4

Composition of Annual Costs of Compliance with EPA Regulations, Participating Companies

Industry	Annual Cost of Capital ($ 000)	Annual Operating Cost ($ 000)	Total Annual Compliance Cost ($ 000)	Annual Cost of Capital as a Percent of Total Annual Cost
	(1)	(2)	(3)	(4)
Forestry	95	8	103	92.2
Bituminous Coal and Lignite	153	0	153	100.0
Other Mining	899	155	1,054	85.3
Food and Kindred Products	2,164	691	2,855	75.8
Lumber and Wood Products	27,076	5,488	32,564	83.1
Paper and Allied Products	47,571	18,186	65,757	72.3
Chemical and Allied Products	331,024	110,136	441,160	75.0
Oil and Gas	200,717	44,721	245,438	81.8
Rubber and Miscellaneous Products	6,725	2,027	8,752	76.8
Stone, Clay, Glass and Concrete Products	6,762	2,845	9,607	70.4
Primary Metal Industries	122,996	41,334	164,330	75.0
Fabricated Metal Products	1,238	571	1,809	68.4
Machinery Except Electrical	21,151	3,747	24,898	85.0
Electrical Machinery	13,277	2,625	15,902	83.5
Transportation Equipment	56,314	429	56,743	99.2
Instruments	8,826	4,959	13,785	64.0
Railroad, Freight and Water Transportation	1,553	420	1,973	78.7
Communication	558	220	778	71.7
Electric and Gas Services	78,509	17,987	96,496	81.4
Wholesale Trade	6	0	6	100.0

Source: Report provided to OTA by Arthur Andersen & Co. under contract OAP 79-43.

Table A-5

Composition of Annual Costs of Compliance with OSHA Regulations, Participating Companies

Industry	Annual Cost of Capital ($ 000)	Estimated Annual Operating Cost ($ 000)	Total Annual Compliance Cost ($ 000)	Annual Cost of Capital as a Percent of Total Annual Cost
	(1)	(2)	(3)	(4)
Forestry	6	0	6	100.0%
Food and Kindred Products	955	42	997	95.8
Lumber and Wood Products	219	8	227	96.5
Paper and Allied Products	720	24	744	96.8
Chemical and Allied Products	28,455	5,678	34,133	83.4
Oil and Gas	2,882	280	3,162	91.1
Rubber and Miscellaneous Products	3,722	692	4,414	84.3
Stone, Clay, Glass and Concrete Products	561	56	617	90.9
Primary Metal Industries	5,491	2,256	7,747	70.9
Fabricated Metal Products	511	28	539	94.8
Machinery Except Electrical	2,825	191	3,016	93.7
Electrical Machinery	15,369	2,682	18,051	85.1
Transportation Equipment	1,053	90	1,143	92.1
Instruments	377	88	465	81.1
Railroad, Freight and Water Transportation	40	21	61	65.6
Communication	593	1	594	99.8
Electric and Gas Services	64	0	64	100.0
Wholesale Trade	3	0	3	100.0
Banking	55	4	59	93.2

Source: Report provided to OTA by Arthur Andersen & Co. under contract OAP 79-43.

APPENDIX B

Estimation of Annual Capital Costs of Compliance With Regulations

Companies participating in the Arthur Andersen study were asked to estimate their capital outlays and the operating costs required for compliance with regulations. The distinction between capital and operating expenses is important for the analysis of public subsidies because subsidies are often applied only to one type of expense, or they are applied in different ways to each. However, data reported on outlays for the acquisition of capital goods, such as buildings, land, and machinery, are not directly comparable to the reported operating costs. Outlays to acquire capital describe a change in the composition of a company's assets but do not directly indicate the annual cost of financing the purchase or keeping the facilities productive. For comparability, it is necessary to develop an annual measure of capital cost to avoid misstating the importance of these costs relative to operating costs. This appendix explains the method used to translate estimates of capital outlays into estimates of annual costs of capital.

The elements of the procedure for annualizing capital expenses are shown in Tables B-1 and B-2 for the costs of compliance with OSHA regulations and EPA regulations respectively. The annual capital cost has three essential components. The first is the annual cost of interest paid to lenders for the portion of capital outlay financed by borrowing. The second component is depreciation; and the third is the cost of income foregone by tying up equity for compliance purposes, rather than for the production of marketable output.

The interest cost (column (1) of the tables) is based on an assumed rate of return to lenders of 10 per cent per year. The portion of capital expenditure financed by borrowing is taken to be uniformly 50 per cent, giving an annual interest cost per dollar of outlay of $.05 in all cases.

Depreciation (column (2) of the tables) is the annual cost of maintaining the value of the capital facilities. This is estimated here to be a constant annual amount that is equivalent, in present value terms, to the deductions for depreciation allowed under the present ADR rules for tax depreciation. 10/

The cost of tying up equity is the opportunity cost of foregoing income that could be earned elsewhere. Unlike interest payments, this cost must be adjusted for Federal corporate income tax. For these estimates, corporate equity is taken to earn a 14 percent return after-tax, an amount larger than the interest return to compensate for risk. Since, by assumption, half of each dollar of outlay is financed by debt, the other half would generate an annual after-tax return cost of $.07 (14 per cent on 50 cents). However, the full cost of equity is measured by the before-tax return so it is necessary to add the associated income tax. For a tax rate of 46 per cent, the sum of the tax and the after-tax return, that is, the before-tax return is $.1296.

A fourth computation is also included to account for an existing capital subsidy -- the investment tax credit. This subsidy has a nominal rate of 10 per cent, but it is effectively larger by 46 per cent (an amount equal to the tax

10/ A relatively low rate of discount (6 per cent) was used to compute present values in recognition of the fact that present law allowances are roughly equivalent to actual depreciation only under conditions of mild inflation and, thus, of low nominal rates of return.

rate) because depreciation deductions are allowed for the portion of capital paid for by the subsidy. The full effect of the investment credit is, thus, to offset 14.6 per cent of annual capital costs. This offset -- 14.6 per cent of the sum of the three components of capital costs -- is shown in column (5) of the tables as a negative item in annual capital cost. Total capital cost per dollar of outlay (column (6)) is, thus, the algebraic sum of the items in column (2)-(5).

These annual measures of capital cost are used throughout the discussion of Chapter 3 as a means of comparing capital and operating costs. They are also used to give an appropriate basis for comparison with annual sales.

Table B-1

Capital Expenditures and Annual Cost of Capital for Compliance with EPA Regulations

Industry	Total Capital Expenditures ($000)	Annual Cost Per Dollar of Capital					Annual Cost of Capital ($000)
		Interest 1/	Depreciation 2/	Return Before Taxes 3/	Investment Tax Credit 4/	Total	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Forestry	272	.05	.23	.1296	-.0598	.3498	95
Bituminous Coal and Lignite	460	.05	.21	.1296	-.0569	.3327	153
Other Mining	2,701	.05	.21	.1296	-.0569	.3327	899
Food and Kindred Products	6.857	.05	.19	.1296	-.0540	.3156	2,164
Lumber and Wood Products	75,567	.05	.24	.1296	-.0613	.3583	27,076
Paper and Allied Products	164,039	.05	.16	.1296	-.0496	.2900	47,571
Chemical and Allied Products	994,962	.05	.21	.1296	-.0596	.3327	331,024
Oil and Gas	735,497	.05	.14	.1296	-.0467	.2729	200,717
Rubber and Miscellaneous Products	22,521	.05	.17	.1296	-.0510	.2986	6,725
Stone, Clay, Glass, & Concrete	23,317	.05	.16	.1296	-.0496	.2900	6,762
Primary Metal Industries	450,701	.05	.14	.1296	-.0467	.2729	122,996
Fabricated Metal Products	3,155	.05	.28	.1296	-.0671	.3925	1,238
Machinery Except Electrical	63,575	.05	.21	.1296	-.0569	.3327	21,151
Electrical Machinery	39,906	.05	.21	.1296	-.0569	.3327	13,277
Transportation Equipment	160,988	.05	.23	.1296	-.0598	.3498	56,314
Instruments	30,434	.05	.16	.1296	-.0496	.2900	8,826
Railroad, Freight & Water Trans.	4,335	.05	.24	.1296	-.0613	.3583	1,553
Communication	2,256	.05	.11	.1296	-.0423	.2473	558
Electric & Gas Services	368,243	.05	.07	.1296	-.0364	.2132	78,509
Wholesale Trade	16	.05	.28	.1296	-.0671	.3925	6
All Participating Companies	3,149,802	.05	.17	.1296	-.0503	.2945	927,614

1/ Based on a rate of return to lenders of 10 percent where half of the capital expenditure is financed by borrowing.

2/ The annual cost of depreciation is estimated as an annual rate equivalent, in present value terms, to tax depreciation currently allowed under ADR.

3/ The sum of income tax, at 46 percent, and after-tax return to equity of 14 percent, where half the capital expenditure is financed by equity.

4/ The annual value of the investment tax credit is calculated as a 14.6 percent offset to all other elements in capital cost. See text for further explanation.

Source: Report provided to the Office of Tax Analysis by Arthur Andersen & Co. under Treasury contract OAP 79-43.

Table B-2

Capital Expenditures and Annual Cost of Capital for Compliance with OSHA Regulations

Industry	Total Capital Expenditures ($000)	Annual Cost Per Dollar of Capital					Annual Cost of Capital ($000)
		Interest 1/	Depreciation 2/	Return Before Taxes 3/	Investment Tax Credit 4/	Total	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Forestry	18	.05	.23	.1296	-.0598	.3498	6
Food and Kindred Products	3,027	.05	.19	.1296	-.0540	.3156	955
Lumber and Wood Products	612	.05	.24	.1296	-.0613	.3583	219
Paper and Allied Products	2,482	.05	.16	.1296	-.0496	.2900	720
Chemical and Allied Products	85,527	.05	.21	.1296	-.0596	.3327	28,455
Oil and Gas	10,569	.05	.14	.1296	-.0467	.2729	2,882
Rubber and Miscellaneous Products	12,466	.05	.17	.1296	-.0510	.2986	3,722
Stone, Clay, Glass, & Concrete	1,935	.05	.16	.1296	-.0496	.2900	561
Primary Metal Industries	20,122	.05	.14	.1296	-.0467	.2729	5,491
Fabricated Metal Products	1,301	.05	.28	.1296	-.0671	.3925	511
Machinery Except Electrical	8,492	.05	.21	.1296	-.0569	.3327	2,825
Electrical Machinery	46,193	.05	.21	.1296	-.0569	.3327	15,369
Transportation Equipment	3,009	.05	.23	.1296	-.0598	.3498	1,053
Instruments	1,299	.05	.16	.1296	-.0496	.2900	377
Railroad, Freight & Water Trans.	111	.05	.24	.1296	-.0613	.3583	40
Communication	2,399	.05	.11	.1296	-.0423	.2473	593
Electric & Gas Services	300	.05	.07	.1296	-.0364	.2132	64
Wholesale Trade	8	.05	.28	.1296	-.0671	.3925	3
Banking	158	.05	.23	.1296	-.0598	.3498	55
All Participating Companies	200,018	.05	.19	.1296	-.0546	.3195	63,901

1/ Based on a rate of return to lenders of 10 percent where half of the capital expenditure is financed by borrowing.

2/ The annual cost of depreciation is estimated as an annual rate equivalent, in present value terms, to tax depreciation currently allowed under ADR.

3/ The sum of income tax, at 46 percent, and after-tax return to equity of 14 percent, where half the capital expenditure is financed by equity.

4/ The annual value of the investment tax credit is calculated as a 14.6 percent offset to all other elements in capital cost. See text for further explanation.

Source: Report provided to the Office of Tax Analysis by Arthur Andersen & Co. under Treasury contract OAP 79-43.