

The Impact of Regulatory Costs on Small Firms

by

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for



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The statements, findings, conclusions, and recommendations found in this study are those of the authors and do not necessarily reflect the views of the Office of Advocacy, the United States Small Business Administration, or the United States Government.

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Purpose

This research updates and further delineates the disproportionality of the burden imposed by federal regulations on small business. Previous research by the Office of Advocacy, Hopkins (1995) and Crain and Hopkins (2001), has established that regulatory and paperwork costs were found to be more onerous on small firms than on larger firms.

Overall Findings

In the face of higher costs of federal regulations, the research shows that small businesses continue to bear a disproportionate share of the federal regulatory burden. The findings are consistent with those in Hopkins (1995) and Crain and Hopkins (2001).

The research finds that the cost of federal regulations totals \$1.1 trillion; the cost per employee for firms with fewer than 20 employees is \$7,647.

Highlights

- This report details the distribution of regulatory costs for five major sectors of the U.S. economy: manufacturing, trade (wholesale and retail), services, health care, and other (a residual category containing all enterprises not included in the other four). The

sector-specific findings reveal that the disproportionate cost burden on small firms is particularly stark for the manufacturing sector. The compliance cost per employee for small manufacturers is at least double the compliance cost for medium-sized and large firms. In the service sector, regulatory costs differ little from small to larger firms.

- The disproportionality of the burden borne by small firms, identified in previous Advocacy studies, is further validated in this instance. On a per-employee basis, it costs about \$2,400, or 45 percent, more for small firms to comply than their larger counterparts. The 2001 study, using a slightly different methodology, concluded that the disproportionality rate was higher—nearly 60 percent.

- Environmental and tax compliance regulations appear to be the main cost drivers in determining the severity of the disproportionate impact on small firms. Compliance with environmental regulations costs 364 percent more in small firms than in large firms. The cost of tax compliance is 67 percent higher in small firms than the cost in large firms. In the aggregate estimates for all sectors, the cost per employee of economic regulations falls most heavily on large firms. The cost per employee of workplace regulations falls most heavily on medium-sized firms.

Type of Regulation	All Firms	Cost per employee for firms with:		
		<20 employees	20-499 employees	500+ employees
All Federal Regulations	\$ 5,633	\$ 7,647	\$ 5,411	\$ 5,282
Economic	\$ 2,567	\$ 2,127	\$ 2,372	\$ 2,952
Workplace	\$ 922	\$ 920	\$ 1,051	\$ 841
Environmental	\$ 1,249	\$ 3,296	\$ 1,040	\$ 710
Tax Compliance	\$ 894	\$ 1,304	\$ 948	\$ 780

Scope and Methodology

The report divides federal regulations into four categories: economic, workplace, environmental, and tax compliance. The two main components of economic regulation are estimated separately; the estimated costs of economic regulations affecting international trade are mainly derived from the report issued by the U.S. International Trade Commission in 2004. The costs of domestic economic regulations, in a significant shift from previous estimates, are first estimated by running a cross-country regression analysis based on data from the Organization for Economic Cooperation and Development. Secondly, gaps in the baseline are filled with Office of Management and Budget (OMB) estimates. The costs of workplace regulations are based on the updated estimates from the study by Joseph Johnson (Office of Advocacy, 2005). Environmental regulations estimates are mainly based on OMB reports. Tax compliance costs, finally, are based on the 2002 report from the Tax Foundation.

The allocation of costs across employment classes was made possible by use of Census data published by the Office of Advocacy.

In accordance with the OMB's and SBA's peer review guidelines, the report has been peer reviewed by three academics in this field of study. More information on this process can be obtained by contacting the Director of Economic Research at advocacy@sba.gov or (202) 205-6533.

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Executive Summary

The annual cost of federal regulations in the United States increased to more than \$1.1 trillion in 2004. Had every household received a bill for an equal share, each would have owed \$10,172, an amount that exceeds what the average American household spent on health care in 2004 (slightly under \$9,000). While all citizens and businesses of course pay some portion of these costs, the distribution of the burden of regulations is quite uneven. The portion of regulatory costs that falls initially on businesses was \$5,633 per employee in 2004, a 4.1 percent cost increase since 2000 after adjusting for inflation. Small businesses, defined as firms employing fewer than 20 employees, bear the largest burden of federal regulations, as they did in the mid-1990s and in 2000. Small businesses face an annual regulatory cost of \$7,647 per employee, which is 45 percent higher than the regulatory cost facing large firms (defined as firms with 500 or more employees).

The regulatory landscape highlighted above and detailed in this report emerges from an updated analysis of the regulatory record explored in two previous studies for the Office of the Chief Counsel for Advocacy of the U.S. Small Business Administration (Hopkins, 1995 and Crain and Hopkins, 2001).

I. Introduction and Purpose

Policymakers know a great deal about U.S. taxing and spending programs; the annual federal budget process and the *Budget of the United States* provide considerable detail regarding where the money comes from and how it is spent. Such fiscal information has been provided systematically for nearly a century and is in fact mandated by the Constitution (Article 1, Section 9). The same cannot be said for federal regulatory programs, which largely escaped any accounting scrutiny until quite limited tracking was mandated by Executive Order 11821 in 1974. The federal “Regulatory Right-to-Know Act,” enacted in 2000, was a major attempt to make information about the costs and benefits of regulations far more transparent and widely available than before. This act requires the U.S. Office of Management and Budget (OMB) to submit an accounting statement and report that includes an estimate of the total annual costs and benefits of federal rules and paperwork “to the extent feasible.”¹

In its most recent report to Congress, OMB (2005) places the total costs of federal regulations at between \$34 billion and \$39 billion (in 2001 dollars). This cost estimate differs markedly from cost estimates in two prior studies commissioned by the Office of the Chief Counsel for Advocacy of the U.S. Small Business Administration (hereafter referred to as “Advocacy”).² Thomas Hopkins (1995) estimated annual federal

¹ 31 U.S.C. § 1105 note, Pub. L. 106-554, ' 1(a) (3) [Title VI, ' 624], Dec. 21, 2000, 114 Stat. 2763, 2763A-161.

² Thomas D. Hopkins, *Profiles of Regulatory Costs. Report to the U.S. Small Business Administration*, U.S. Department of Commerce, National Technical Information Service #PB96 128038, November 1995 (<http://www.sba.gov/advo/>). W. Mark Crain and Thomas D. Hopkins, *The Impact of Regulatory Costs on Small Firms*, U.S. Small Business Administration, 2001 (<http://www.sba.gov/advo/>). Hopkins (1995) began to fill the information vacuum regarding the federal regulatory burden, presenting a profile of the level and distribution of federal regulatory compliance costs using data through 1992, and made cost projections through 2000. The Hopkins study was updated and extended in Crain and Hopkins (2001), who examined the actual as distinct from projected regulatory burden in 2000.

regulatory costs to be \$777 billion, and Mark Crain and Thomas Hopkins (2001) estimated the annual costs to be \$876 billion (both numbers are converted here to 2001 dollars, the base year used in OMB's 2005 report). According to these two studies for Advocacy, the costs of federal regulations are at least 20 times larger than the costs reported by OMB. What accounts for this vast discrepancy?

OMB confronts this issue openly and candidly, stating “the total costs and benefits of all Federal rules now in effect ...could easily be a factor of ten or more larger than the sum of the costs and benefits” reported in their accounting statement for 2005.³ Indeed, the two main factors that cause OMB's estimates to be so low relative to the Advocacy studies are easy to pinpoint. First, in compiling its accounting statement OMB includes only those regulations that it cleared during the previous 10 years, which in the 2005 report included October 1, 1994 to September 30, 2004. Limiting the analysis to this time period omits some of the most costly federal regulations, such as the regulations stemming from the parts of the Clean Air Act and its amendments that were enacted before October 1, 1994. Second, the annual OMB accounting statements are based solely on cost-benefit analyses that were performed by the separate federal agencies.⁴ In other words, the sources for the cost and benefit estimates that OMB uses to compile its accounting statement are the federal agencies that promulgate and enforce regulations. This means that while the annual OMB accounting statements offer a trove of relevant information, the coverage in these reports is circumscribed; federal agencies have not assessed the costs (or the benefits) for a host of regulatory activities, past and present. This is particularly problematic in the case of economic regulations —

³ U.S. Office of Management and Budget, Office of Information and Regulatory Affairs (2005), *Draft Report to Congress on the Costs and Benefits of Federal Regulations*, p. 9.

⁴ In some cases, the cost estimates are based on OMB's transparent modifications of agency-provided cost-benefit estimates. Agencies are not required to perform cost-benefit analyses on regulations that are expected to have an economic impact of less than \$100 million, and thus these are omitted from OMB's cost estimate.

pre- and post-1994 — that have not been analyzed by federal agencies and therefore have not been included in OMB’s annual accounting. Burdensome economic regulations such as import restrictions, antitrust policies, telecommunications policies, product safety laws, and many other restraints on business activities are implemented outside of the OMB regulatory review process.⁵ None of these regulatory costs are therefore considered in OMB’s annual report.

These and other differences between OMB’s cost calculations and those used in this study will be described in further detail in the sections that follow. This up-front preview is simply to provide some appreciation for what explains the rather glaring gap between OMB’s cost estimates and the cost estimates in Hopkins (1995), Crain and Hopkins (2001), as well as those presented in this study. An appreciation of the limitations on OMB’s regulatory accounting procedures also buttresses the purpose for this study, which is to enhance and expand the universe of federal regulations covered by the cost estimates. OMB’s cost estimates are used whenever possible in this report, in particular for environmental regulations. In the case of regulatory activities for which OMB does not offer cost estimates, the report relies on other secondary sources, or in some instances, performs original analysis to approximate the costs. For example, the report estimates an original econometric model and then uses the parameters to measure the cost of domestic economic regulations.

This report seeks to update and improve the 1995 and 2001 studies for Advocacy and advance the understanding of who bears what burdens from regulation. In particular, the report seeks to identify the federal regulatory burden on small U.S. firms, and to assess whether and to what extent this burden disadvantages small businesses

⁵ For example, regulations implemented directly through the legislative process are outside the OMB review process. Furthermore, the totality of rules, both existing and new, with anticipated impacts below \$100 million, and not subject to the Paperwork Reduction Act, are also outside the OMB review process.

relative to their larger competitors. Underlying the significance of this assessment for the U.S. economy is the fact that 90 percent of all firms in the United States employ fewer than 20 employees. By comparison, large firms (those with 500 or more employees) account for only 0.3 percent of all U.S. firms.⁶ If federal regulations place a differentially large cost on small business, this would potentially cause inefficiencies in the structure of American enterprises and the relocation of production facilities to less regulated countries, and adversely affect the international competitiveness of domestically produced American products and services. All of these effects, of course, would have negative consequences for the U.S. labor market.

Some Key Findings: The Cost of Federal Regulations in 2004

The findings in this report indicate that in 2004, U.S. federal government regulations cost an estimated \$1.1 trillion, or 11 percent of national income. This cost burden has increased 16 percent in inflation-adjusted dollars relative to the Crain and Hopkins (2001) estimate for 2000.⁷ The cost of complying with federal regulations in 2004 was more than half as large as total U.S. federal government receipts, which equaled 18 percent of national income. An interesting observation is that while federal government receipts as a share of the economy declined between 2000 and 2004, the federal regulatory burden grew. Combined, these two costs of federal government programs in 2004 amounted to 27 percent of national income, which represents a substantial burden on U.S. citizens and businesses.

⁶ Large firms employ roughly half of all workers, whereas small firms employ 18 percent of all workers in the United States.

⁷ As will be explained further below, this growth rate relative to 2000 adjusts the Crain – Hopkins (2001) figure upward to be consistent with the new measurement techniques adopted in the present report.

The findings in this report further indicate that in the distribution of federal regulatory costs, a disproportionately large share falls on small businesses. This result is consistent with the findings in Hopkins (1995) and Crain and Hopkins (2001), as well as other studies completed during the past 25 years.⁸ Table 1 summarizes the incidence pattern by firm size based on aggregate data for all U.S. businesses.

Table 1. Annual Incidence of Federal Regulations by Firm Size in 2004 (Dollars)*

Type of Regulation	All Firms	Cost per Employee for Firms with:		
		<20 Employees	20-499 Employees	500+ Employees
All Federal Regulations	5,633	7,647	5,411	5,282
Economic	2,567	2,127	2,372	2,952
Workplace	922	920	1,051	841
Environmental	1,249	3,296	1,040	710
Tax Compliance	894	1,304	948	780

*** Notes to Table 1:**

These calculations use employment shares for the respective business sectors to compute the weighted average cost per employee for all firms. The estimates are denominated in 2004 dollars.

⁸ Such studies include Henry B. R. Beale and King Lin, *Impacts of Federal Regulations, Paperwork, and Tax Requirements on Small Business*, SBAHQ-95-C-0023; Microeconomic Applications, Inc., prepared for the Office of Advocacy, U.S. Small Business Administration, September, 1998; Roland J. Cole and Paul Sommers, *Costs of Compliance in Small and Moderate-sized Businesses*, SBA-79-2668, Battelle Human Affairs Research Centers, Seattle, WA, February, 1980; *Improving Economic Analysis of Government Regulations on Small Business*, SBA-2648-OA-79, JACA Corporation, Fort Washington, PA, January, 1981; Robert J. Gaston and Sidney L. Carroll, *State and Local Regulatory Restrictions as Fixed Cost Barriers to Small Business Enterprise*, SBA-7167-AER-83, Applied Economics Group, Inc., Knoxville, TN, April, 1984; and, *Economies of Scale in Regulatory Compliance: Evidence of the Differential Impacts of Regulation by Firm Size*, SBA-7188-OA-83, Jack Faucett Associates, Chevy Chase, MD, December, 1984. For a theoretical discussion, see William A. Brock and David S. Evans, *The Economics of Small Businesses: Their Role and Regulation in the U.S. Economy*, Holmes & Meier, New York, NY, 1986, especially chapters 4 and 5. A recent survey and extension of this literature is provided by Steven C. Bradford, "Does Size Matter? An Economic Analysis of Small Business Exemptions from Regulation," *The Journal of Small and Emerging Business Law*, 8 (1), 2004, pp. 1-37.

Considering all federal regulations, all sectors of the U.S. economy, and all firm sizes, regulations cost \$5,633 per employee per year. For firms with fewer than 20 employees, the cost is \$7,647 per employee per year. The cost is \$5,411 in medium-sized firms and \$5,282 in large firms. Costs per employee thus appear to be at least 40 percent higher in small firms than in medium-sized and large firms.

The cost disadvantage faced by small businesses is driven largely by compliance with environmental regulations and tax-related paperwork, as Table 1 illustrates.⁹ Compliance with environmental regulations costs 364 percent more in small firms than in large firms. The cost of tax compliance is 67 percent higher in small firms than in large firms. The particular drivers of the cost distribution among firm sizes differ across the five business sectors. Later sections of the report lay out these patterns in explicit detail. It is worth emphasizing that not all regulations fall more heavily on small businesses than on larger firms. For example, in the aggregate estimates for all sectors (Table 1), the cost per employee of economic regulations falls most heavily on large firms. The cost per employee of workplace regulations falls most heavily on medium-sized firms. This most likely reflects the fact that small firms are exempt from several of the major workplace regulations, an institutional detail that will be further discussed in the methodological section of the report.

⁹ Other studies are consistent with this finding of economies of scale in environmental regulatory compliance. See, for examples, Thomas J. Dean, "Pollution Regulations as a Barrier to the Formation of Small Manufacturing Establishments: A Longitudinal Analysis," Office of Advocacy, U.S. Small Business Administration: Washington, D.C., 1994; and Thomas J. Dean, *et al.*, "Environmental Regulation as a Barrier to the Formation of Small Manufacturing Establishments: A Longitudinal Analysis," *Journal of Environmental Economics and Management* 40, 2000, pp. 56-75. These two studies suggest that regulatory costs lower the startup rate for new firms, especially in the manufacturing sector, because of its higher capital requirements from environmental and other types of regulations. They also indicate that environmental regulations increase the minimum efficient scale of production. See also the related study by Samuel Staley, *et al.*, *Giving A Leg Up to Bootstrap Entrepreneurship: Expanding Economic Opportunity in America's Urban Centers*, Los Angeles: Reason Public Policy Institute, 2001.

This report details the distribution of regulatory costs for five major sectors of the U.S. economy: manufacturing, trade (wholesale and retail), services, health care, and other (a residual category containing all enterprises not included in the other four). The sector-specific findings reveal that the disproportionate cost burden on small firms is particularly stark for the manufacturing sector. The compliance cost per employee for small manufacturers is at least double the compliance cost for medium-sized and large firms. In the service sector, regulatory costs differ little from small businesses to larger-size firms. The distribution of the regulatory burden across firm sizes in the other major business sectors falls somewhere in between these two cases.

The remainder of the report is organized into three sections and six appendices. Section II gives an overview of the regulatory accounting methodology and describes the primary sources for the cost estimates used in the report. Section III begins with a snapshot of American enterprise, showing the distribution of firms, employees, and payroll expenditures within the major sectors of the U.S. economy. It then presents the underlying assumptions and maps the methods used to allocate: (i) the total regulatory burden that falls on business, (ii) the regulatory costs across business sectors, and (iii) the regulatory costs by firm size within each sector. Section IV provides the main findings for the distribution of the federal regulatory burden across the sectors and firm sizes. The appendices contain details for the various analytical procedures used in the report, supplemental information about the “on-budget” expenditures on federal regulatory programs, and the distribution of regulatory costs in the previous study by Crain and Hopkins (2001).

This report does not address the benefits of regulation, an important challenge that would be a logical next step toward achieving a rational regulatory system. The annual accounting statements compiled by OMB moves toward such a system by presenting partial estimates of benefits as well as costs. This report, thus, should be

seen as a building block toward a broader understanding of the costs of regulation, much but not all of which creates important and substantial benefits.

II. Scope of Regulatory Costs

Perspective on Regulatory Accounting

The imbalance between what is known about the costs and benefits of government regulations versus government fiscal programs is hardly surprising. Regulatory accounting requires the discovery of relevant costs and benefits not reflected in any governmental cash flow, which is inherently a difficult task. Fiscal accounting is simpler in two respects: it has the luxury of using well documented monetary flows tied to tax receipts and agency expenditures, and it tracks costs but not the associated benefits. Notwithstanding the practical difficulties associated with regulatory accounting, the impact of government regulations on business and citizen activities is no less real than the impact of fiscal programs.

The total direct cost of federal regulations consists of resources employed by government agencies as well as by private sector enterprises. The regulatory costs included in this report focus on the latter: the resource costs over and above those that show up in the federal budget and agency personnel charts. The report provides an accounting of the nonbudgeted costs imposed on individuals and businesses to comply with regulations. A simple example illustrates this perspective on regulatory accounting. The total direct cost to the nation of, say, a pollution control regulation consists of spending by the U.S. Environmental Protection Agency for monitoring and enforcement activities, plus spending by businesses to install abatement equipment, hire engineers, and so on to comply with the regulatory rules. EPA spending shows up in the federal budget, and therefore would not be included in this report's cost accounting. Rather, this report includes estimates of the impact on those who are regulated: the spending by businesses to install abatement equipment, hire engineers, and so forth. In this sense, the estimates presented understate the full cost of federal regulations.

Regulatory agency spending — the cost component this report excludes — amounts to only about 4 percent of the nonbudgeted regulatory compliance costs on which this report focuses. Nonetheless, spending by federal regulatory agencies on regulatory activity reached \$37 billion in fiscal year 2004, so it is not trivial. Appendix 6 provides the on-budget costs of federal regulations, and shows how these costs have grown over time. Between 1990 and 2004 regulatory agency budgets grew by 88 percent in inflation-adjusted dollars, a 6.3 percent real annualized growth rate.¹⁰ Total staffing in federal regulatory agencies in fiscal year 2004 equaled 239,624 full-time equivalent employees. These staffing levels grew by 56 percent between 1990 and 2004, or 4 percent on an annualized basis. While these on-budget indicators of federal regulatory costs are large and growing, they pale in comparison to the size of the nonbudgeted compliance costs on which this report focuses.

Other important regulatory costs are not captured in this report's estimates, most notably activities by state and local governments, indirect burdens, and general equilibrium effects. Each of the 50 American states has an array of regulations superimposed on federal regulations. These costs are not explicitly considered here but do add to the nation's total regulatory burden.¹¹

The report uses various methods to determine how the costs of regulations are distributed: between businesses and individuals, among sectors of businesses, and among businesses of different sizes. These tend to reflect the initial or statutory burden of the regulations, that is, based on who bears the initial compliance costs. It needs to be

¹⁰ These data are from Susan E. Dudley and Melinda Warren (2004), *Regulators' Budget Continues to Rise: An Analysis of the U.S. Budget for Fiscal Years 2004 and 2005*, Regulatory Report 26, Arlington, VA: Mercatus Center, George Mason University. Appendix 6 presents additional details of their study.

¹¹ A few researchers have attempted to rank states in terms of regulatory burden, for example, John D. Byars, Robert E. McCormick, and T. Bruce Yandle, *Economic Freedom in America's 50 States: A 1999 Analysis*, State Policy Network, 1999, and Ying Huang, Robert E. McCormick, and Lawrence McQuillen, *U.S. Economic Freedom Index: 2004 Report*, Pacific Research Institute, 2004. However, no estimates of the costs of state regulations are available.

acknowledged that this initial compliance burden can be shifted and the final incidence of regulations may differ from this initial or statutory assignment of the regulatory costs. The difference between the statutory burden and how costs are ultimately divided depends on the demand and supply elasticities in the respective markets. The final incidence of the federal regulatory burden is likely to differ from the initial incidence of costs, just as how government collects a tax typically differs from who finally pays for the tax. While acknowledging that shifting in the cost burdens will occur, this report does not attempt to model these changes because the estimates of the relevant supply and demand elasticities for different sectors of the U.S. economy are not sufficiently consistent or reliable. This issue is addressed again in Section III.

Similarly, the report does not attempt to account for indirect or second-order costs of regulations. For example, environmental regulations directly affect the cost of producing electricity, and these show up as a direct cost for electric utilities. The report's cost estimates include these types of direct costs. Yet increases in the cost of electricity have ripple effects throughout the American economy in the form of higher energy costs, thus indirectly raising costs in virtually every sector. Some of these costs will be shifted even further onto consumers in the form of higher prices (for energy directly, and for the products that now cost more because of higher energy costs). For another example, regulations that raise the cost of health care will be shifted forward, at least partially, in the form of higher rates businesses must pay for group health insurance premiums and other health care-related outlays. In turn, businesses will attempt to shift the burden of these higher health care-related outlays by increasing consumer prices or requiring employees to pay a larger share of health care costs.

Other general equilibrium effects include a reduction in dynamic efficiency, such as slowing innovations that would lead to productivity gains and therefore general economic expansions over time. Again, the study does not measure the dynamic effects;

omission of the indirect and general equilibrium effects means that the estimates in the report understate the full burden of federal regulations.¹²

As a final comment on the general approach to regulatory accounting, following most modern analyses, the cost estimates include two broad elements, typically labeled efficiency costs and transfer costs. An efficiency cost reflects the value of the resources foregone in direct response to restrictions on firm entry, output and pricing decisions, or cost-minimizing production techniques. In other words, what is the value of the product or service that is lost as a result of an economic regulation? A transfer cost, as the name implies, refers to the redistribution of income or wealth in direct response to a regulation. In brief, the central argument for counting transfers as a cost is that it approximates the real resources that will be devoted to acquiring, maintaining, opposing, or eliminating the responsible regulation. The real resources used in activities to acquire and maintain, or to prevent and eliminate economic regulations are diverted from other, productive economic activities. As such, economic regulations that result in wealth transfers create a real resource burden on the economy. The approach used in this report to approximate the transfer costs of economic regulations is the same method used by Hopkins, 1995; OMB, 2000; and Crain and Hopkins, 2001.¹³

¹² Hazilla and Kopp provide estimates of the indirect effects of environmental regulations as well as the dynamic consequences. Their evidence suggests that both of these costs are substantial. See Michael Hazilla and Raymond Kopp, "The Social Cost of Environmental Quality Regulations: A General Equilibrium Analysis," *Journal of Political Economy*, Vol. 98 (4), 1990. It is important to emphasize that the benefits of regulations might also be greater in a general equilibrium analysis than in partial equilibrium, and thus social welfare (benefits net of costs) might be higher in a general equilibrium than in a partial equilibrium analysis.

¹³ The social costs associated with government activities that transfer wealth has a long history in economic analysis, beginning with the seminal paper by Gordon Tullock, "The Welfare Cost of Tariffs, Monopolies, and Theft," *Western Economic Journal*, 5, 1967, pp. 224-232. Richard A. Posner, "The Social Costs of Monopoly and Regulation," *Journal of Political Economy*, 83 (4), 1975, pp. 807-828, expands on Tullock's analogy to theft to illustrate efficiency and transfer costs: "The transfer from victim to thief involves no artificial limitation on output, but it does not follow that the social costs are zero. The opportunity for such transfers draws resources into thieving and in turn into protection against theft, and the opportunity cost of the resources consumed are social costs of theft. If a thief took three radios from a home and on the way out dropped one,

Major Categories of Federal Regulations: Sources and Methods

The report divides federal regulations into four categories: economic, workplace, environmental, and tax compliance.¹⁴ A description of each category follows, along with an explanation of the primary sources and methods used to derive the compliance cost estimates.

1. Economic Regulations

Economic regulations include a wide range of constraints and incentive mechanisms concerning market access, the use of inputs and production techniques, output choices, pricing decisions, and international trade, and investment; for example, laws that impose quotas and tariffs on foreign imports limit competition, raise prices, reduce production and employment, and generally curtail U.S. economic activity. In its 2005 report, OMB discusses and recognizes the potentially large impact of such regulatory activity (OMB, 2005, pp. 29-34). Nonetheless, OMB has not yet implemented estimates of a host of economic regulations, beyond those for which it has reviewed regulatory impact statements submitted by federal agencies during the past 10 years. As noted in the introduction to this report, OMB recognizes that the costs associated with regulatory activity not considered in its accounting statement are potentially quite large.

This report seeks to expand the coverage by providing a method to assess the costs of broad-based economic regulations. While the methodology is certainly

which broke, the resulting loss would correspond to the deadweight [efficiency] loss of monopoly.” A survey of the intellectual development, contributors, and controversies in this literature is contained in Robert D. Tollison, “Rent Seeking,” in Dennis C. Mueller, (ed.) *Perspectives on Public Choice: A Handbook*, Cambridge, U.K., Cambridge University Press, 1997.

¹⁴ These are the same four categories used in the 2001 Crain and Hopkins study. These conform reasonably well with the divisions used by the U.S. Office of Management and Budget in its annual reports to Congress. Hopkins (1995) used slightly different categories: Environmental, Other Social, Economic, and Process.

imperfect, it provides a reasonable step. One obvious improvement is that it brings into the analysis the costs of economic regulations that are the result of statutory actions as well as those that are the result of administrative actions. The cost of regulations affecting international trade and the cost of domestic economic regulations are derived separately and described in turn.

Regulations on International Trade. The estimated cost of economic regulations affecting international trade is based on the most recent, 2004 report issued by the United States International Trade Commission (hereafter ITC).¹⁵ The ITC report states that for 2002 “the elimination of significant U.S. import restraints generates gains of \$14.1 billion in economic welfare, while removing all import restraints generates gains of about \$16.3 billion” (ITC, 2004, p. 121). A noteworthy qualification here is that the ITC’s estimate of the welfare loss (the loss in consumer plus producer surplus) understates the cost of international economic regulations. This is because the ITC’s general equilibrium model measures the net value of all gains and losses from trade liberalization to the U.S. economy as a whole, *i.e.*, gains or losses in labor or capital income, tax increases or decreases, as well as the consumption effects from changes in real prices. In the absence of a way to separate the gross costs of international economic regulations, this report uses as a proxy the net welfare loss, that is, the costs in excess of the benefits. Extrapolating the ITC net cost estimate in 2002 as a share of GDP, which equals 0.16 percent of U.S. GDP to 2004 yields \$18.2 billion (in 2004 dollars).

The ITC’s methodology takes into consideration the direct efficiency losses associated with international trade restrictions. To account for the additional burden associated with the transfer costs of trade restrictions, the ITC figure is supplemented

¹⁵ United States International Trade Commission, *The Economic Effects of Significant U.S. Import Restraints*, Fourth Update, June 2004, Investigation No. 332-325.

using the approach suggested by Hahn and Hird (1991). Specifically, this approach estimates the transfer costs as a multiple of efficiency costs. Using a multiple of two (the conservative end of the range suggested by Hahn and Hird and used in Crain and Hopkins, 2001), the transfer costs of international trade restrictions amount to \$36 billion, which brings the total cost of the international trade component of economic regulations to \$55 billion.¹⁶

Domestic Economic Regulations. The cost of domestic economic regulations is constructed from two elements. The first uses cross-country regression analysis to estimate the impact of a broad index of economic regulations on the national output (GDP). The regression-based cost estimate employs an index of regulatory constraints constructed by the Organization for Economic Cooperation and Development (OECD).¹⁷ This index covers most types of domestic economic regulations, or what the OECD study labels inward-oriented policies as opposed to outward-oriented policies. As an illustration, the *OECD Index* covers regulations affecting road freight transportation such as setting conditions for driving and rest periods and constraints on back hauling, private carriage, contract carriage, and intermodal operations. In addition, the *OECD Index*

¹⁶ In the context of international trade restrictions, rent dissipation could transfer resources to U.S. citizens, offsetting rather than augmenting the inefficiency costs (from the perspective of American welfare). It depends on whether U.S. or foreign parties are doing the dissipating and on whom. The analysis here assumes that foreign firms or governments are able to compete in the U.S. political process by hiring K Street lobbyists, media and public relations consultants, and by forming alliances with U.S.-based organizations. In other words, the analysis assumes non-U.S. firms can compete effectively in the U.S. policymaking process.

¹⁷ This Index is described in G. Nicoletti, Scarpetta and O. Boylaud (2000), "Summary Indicators of Product Market Regulation and Employment Protection Legislation for the Purpose of International Comparisons," *OECD Economics Department Working Paper*, No. 226. It should be noted that the Crain and Hopkins (2001) report for the SBA used an alternative estimate based on the findings in Organization for Economic Cooperation and Development, *Regulatory Reform in the United States*, OECD Reviews of Regulatory Reform, Paris, 1999. Similarly, OMB in its 2000 Report used the former OECD method for estimating economic regulations. The shortcoming with the former method is that it fails to account for deregulation of various industries in the 1980s and 1990s.

incorporates administrative burdens on startups such as the minimum number of procedures and the maximum number of weeks required to commence operations.

The second element attempts to fill some gaps in the baseline cost estimate by adding in OMB cost estimates as appropriate. For example, the *OECD Index* does not cover two key types of economic regulations, and it stops in 2002. Both elements are discussed in turn.

Cross-Country Regression Model. The cost of domestic economic regulations is derived in part using regression analysis to estimate the impact of regulations on aggregate economic output, or GDP. In general, the approach is to estimate the impact of an index of economic regulations on the economies of OECD member countries (which includes the United States). This portion of the cost of domestic economic regulations is referred to as the “baseline” estimate, simply because the estimation procedure takes into account most domestic economic regulatory activity.

The form of the regression model is specified in Equation 1.

$$\text{(Eq. 1) GDP per Capita}_i = \beta (\text{OECD Index of Economic Regulations})_i + \phi (\mathbf{X})_i + \alpha_i + \varepsilon_i$$

The sample used to estimate Equation (1) consists of 24 OECD countries for which data on all of the relevant variables are available. The variable subscript i in Equation (1) denotes an observation in a particular country i ($= 1, \dots, 24$). The variables used in the analysis are averaged over the four-year period 1998 through 2002, the most recent year data are available. The data are averaged over the four years for several reasons. First, the *OECD Index* offers a snapshot of the regulatory environment “in (or around)

1998, and some of the regulatory impact might not be fully realized for several years.¹⁸ Second, GDP is subject to random shocks, independent of the regulatory environment (or the other variables controlled for in the model). Averaging is one technique to dampen the influence of an unusually high or low GDP level in a single year.¹⁹

The dependent variable, GDP per capita, is real GDP per capita, denominated in constant 1995 U.S. dollars and averaged over 1998 through 2002 (source: World Bank, 2004). The main explanatory variable of interest in Equation (1) is the *OECD Index of Economic Regulations* (source: *OECD International Regulation Database*, 2000). This *OECD Index* increases along a 0-6 scale with the degree of restrictions that regulations impose on market competition. A detailed description of the *OECD Index of Economic Regulations* and its construction is provided in Appendix 1 of this report.

The model also includes several economic and demographic control variables, represented by the vector \mathbf{X} in Equation (1). These control variables are drawn from the voluminous empirical literature that examines differences in economic levels across countries and over time (for useful surveys of this literature, see Hall and Jones, 1997, Barro and Sala-i-Martin, 1995, and Barro, 1997). The set of controls included in \mathbf{X} are: foreign trade as a share of GDP, primary school enrollment as a share of the eligible population, GDP per capita in 1988, and an index of the ethno-linguistic diversity within each country (data source: World Bank, 2004). Appendix Table A-1 lists all the data used in the regression analysis for all countries in the OECD sample.

¹⁸ Of course, lagged effects could have a positive or negative impact on costs. For example, the cost of regulations might fall over time as businesses discover more effective compliance techniques and simply learn from experience. Alternatively, enforcement of new regulations might take a year or more to be implemented fully.

¹⁹ Estimating the parameters in Equation (1) using a panel data set is not an appropriate method here because the *OECD Index* is a snapshot in the late 1990s, and the relevant time period is too short to use fixed country effects.

The results of estimating Equation 1 are shown in Table 2. Two models are reported in Table 2, reflecting two alternative dependent variables: the level of real GDP per capita and the annualized growth in real GDP per capita. The model on the level of GDP per capita is used to calibrate the baseline cost of domestic economic regulations, and the growth rate model is shown to illustrate the robustness of the model.

Table 2. Regression Results on the Impact of Domestic Economic Regulations on GDP across OECD Countries

Independent Variable	GDP per Capita, 1998-2002^a	GDP per Capita Growth Rate, 1998-2002^a
OECD Economic Regulation Index	-1,343	-0.009
	(2.13)*	(2.09)*
GDP per Capita, 1988 ^a	1.078	-0.000
	(23.58)**	(1.41)
Ethnolinguistic Diversity Index	-69.99	-0.000
	(2.97)**	(2.02)
Trade as a Share of GDP (1998-02)	44.71	0.000
	(2.90)**	(3.08)**
Primary Education as a Percent of the Eligible Population	-58.4	-0.001
	(0.91)	(1.54)
Constant	10,487	0.126
	(1.55)	(2.00)
Observations	24	24
Adjusted R-squared	0.97	0.43

Notes to Table 2:

^a Denominated in 1995 U.S. dollars.

Robust t statistics in parentheses where:

* indicates significance at the 5 percent confidence level.

** indicates significance at the 1 percent confidence level.

As reported in Table 2, the coefficient on the OECD *Index of Economic Regulation* is negative and significant at the 5 percent confidence level. This indicates that more stringent restrictions systematically dampen a country's aggregate economic activity, as reflected by the level of its GDP per capita. The estimated coefficient in the GDP per capita model is -1,343. This means that a one-unit change in the OECD

Economic Regulation Index corresponds to a reduction in real GDP per capita of \$1,343 (denominated in 1995 dollars).²⁰ The index value for the United States is equal to 1 (see Appendix 1, Table A-1), which implies that a change from 1 to zero (eliminating domestic economic regulatory restrictions completely) would increase annual U.S. GDP per capita by \$1,343. This amounts to a 4.3 percent expansion in U.S. GDP per capita using the four-year averaged value (= \$31,296 in 1995 dollars). Symmetrically, an increase in the Index value in the U.S. from 0 (no regulatory restrictions) to 1 (the level indicated in the *OECD Regulatory Index*) implies a 4.3 percent reduction in U.S. GDP per capita.

This predicted 4.3 percent reduction in GDP obtained in the regression analysis is used to extrapolate the baseline domestic economic costs imposed on the U.S. economy in 2004. The result of this procedure, which accounts for most domestic economic regulations in force through 2002, is an estimated baseline cost of \$504 billion in 2004 (in 2004 dollars).

Augmenting the Baseline Costs with OMB Cost Estimates. The second element used to construct the cost of domestic economic regulations seeks to account for the types of regulations that are missing from the *OECD Index*, and regulations that were issued after 2002 (the final year covered by the regression model above). This second element relies on costs reported by OMB. These include the costs of economic regulations that were issued between late 2001 and mid-2004 (the most recently available estimates from OMB). The logic here is that the compliance costs for these

²⁰ For comparison, when Equation (1) is estimated without the control variables, the estimated coefficient on the *OECD Economic Regulation Index* equals -5822, which is significant at the 5 percent level. The coefficient on the *OECD Economic Regulation Index* remains negative and significant at the 5 percent level or higher under all variations of the control variables except one. The size of the *OECD Economic Regulation Index* coefficient is smallest in the model reported in Table 2 (-1,343) than in alternative specifications. In other words, the parameter estimate used in the report for the baseline cost of domestic economic regulations is on the low end of the range of estimates using this regression analysis.

recently issued regulations became relevant subsequent to the time period covered by the OECD Index.

This report also adds to the baseline costs estimate the costs of regulations reported by OMB for types of regulations explicitly omitted from the OECD regulatory index, such as regulations related to agriculture, education, health and human services, and housing and urban development. As noted in Appendix 1 (see Summary Description of the OECD Index of Economic Regulations), the OECD Index does not include two major types of economic regulations: agriculture and health care. (See Table A-2 in Appendix 1 for a list of the specific business sectors that are covered in the OECD Index). The cost estimates for agriculture and health care regulations are taken from the OMB annual reports to Congress, and used to supplement the baseline economic costs obtained from the regression analysis. This includes the annual costs reported by OMB for regulations of these types issued between 1992 and mid-2004. These combined efficiency costs, as reported by OMB (and not included in the baseline estimate), total \$11 billion.²¹ Again, using a multiple of two as described above, the transfer costs associated with these OMB reported regulations is \$22 billion.

In summary, the cost of domestic economic regulations is an estimated \$536 billion, and the combined cost of domestic and international trade regulations is an estimated \$591 billion. Table 3 provides an overview of the sources and a breakdown of the cost estimates for economic regulations.

²¹ These costs of economic regulations are taken from OMB (2004) Table 1 and OMB (2003) Table 1. For some regulations, OMB presents a range for the estimated costs. In those cases, the high end of the cost range is used.

Table 3. Sources and Breakdown of the Estimated Costs of Economic Regulations

Type of Economic Regulation		Cost Estimate in Billions of 2004 \$	Source / Procedure
International Trade Regulations	Efficiency Cost	18.5	U.S. International Trade Commission (2004)
	Transfer Costs	36	Hahn and Hird (1991) procedure described in text.
Baseline Domestic Regulations	Efficiency plus Transfer Costs	504	Regression analysis procedure described in text
Domestic Regulations Covered in Baseline Estimate, Newly Issued in 2001-2004	Efficiency Cost	11	OMB (2003), OMB (2004), OMB (2005)
	Transfer Costs	22	Hahn and Hird (1991) procedure described in text.
Domestic Regulations not covered in Baseline Estimate, Issued in 1992-2003	Efficiency Cost	6.4	OMB (2003) and OMB (2004)
	Transfer Costs	13	Hahn and Hird (1991) procedure described in text.
Total		591	

2. Workplace Regulations

Workplace regulations are defined as those rules issued primarily by the Department of Labor that govern the relationships either between employers and employees or, in some limited cases, employers and the public. This covers a wide array of different regulations dealing with wages, benefits, safety and health, and civil rights, among other things. These regulations cover such topics as the benefits an employer must provide an employee, the safety precautions he or she must undertake, and the procedures he or she must follow in certain situations. Importantly, workplace regulations tend to be very general and cover most, if not all, industries, as well as most firms, with the smallest firms being exempted in some cases.

The source for the cost estimate for workplace regulations is the 2005 study by Joseph Johnson.²² The Johnson study offers a synthesis and evaluation of available estimates of the cost of regulations directed at the workplace, and from these different studies, generates an estimate of the total cost of workplace regulation. It provides the most comprehensive analysis to date, covering the 25 statutory acts and executive orders that encompass all significant workplace regulations promulgated by the federal government through 2001. These 25 statutory acts and executive orders are listed in Appendix 2, reflecting an earlier report by the United States General Accounting Office (1994). Johnson surveys numerous government reports (including regulatory impact analyses, or RIA's, issued by federal government agencies) and academic studies that estimate costs for specific regulations, and identifies from these the most reliable. OMB does not report costs for any workplace regulations that were issued subsequent to those covered in the Johnson study.

Aggregating across the 25 statutory acts and executive orders, Johnson places the cost of workplace regulations in 2000 at \$91 billion. The Johnson estimate (which was denominated in 2000 dollars) here is converted into 2004 dollars using the Employment Cost Index from the United States Bureau of Labor Statistics.²³ This conversion places the costs of workplace regulations at \$106 billion. Following GAO and Johnson, Table 3 presents these costs divided into five major types of workplace regulations. It is noteworthy that OSHA regulations account for 53 percent of the compliance costs of all workplace regulations.

²² Joseph M. Johnson (2005), "A Review and Synthesis of the Cost of Workplace Regulations," in *Cross-Border Human Resources, Labor and Employment Issues*. Andrew P. Morriss and Samuel Estreicher (eds.), Kluwer Law International: Netherlands, pp. 433-67.

²³ U.S. Department of Labor, Bureau of Labor Statistics website, <http://data.bls.gov/cgi-bin/surveymost>.

Table 4. Estimated Costs of Workplace Regulations, by Major Category *

Type of Workplace Regulation	Cost Estimate (Millions of 2004 \$)	Percent of Cost of All Workplace Regulations
Labor Standards	1,450	1
Employee Benefits	21,530	20
Labor-Management Relations	4,600	4
Occupational Safety and Health	56,638	53
Civil Rights	7,670	7
Employment Decision Laws	14,207	13
Total	106,094	

* **Source:** Johnson, 2005 (denominated in 2004 dollars using the U.S. Bureau of Labor Statistics, Employment Cost Index)

3. Environmental Regulations

The main source for the cost estimates for environmental regulations is OMB reports. This is because, unlike the other regulatory categories in this report, OMB's coverage of environmental regulations has been relatively complete. OMB has reviewed the regulatory impact analyses for the most costly regulations promulgated by the Environmental Protection Agency back through the late 1980s. In its reports, OMB has relied on the cost estimates in Hahn and Hird (1991) to gauge the costs of environmental regulations prior to 1988.

Table 5 lists the sources and estimated annual costs for environmental regulations that were enacted during various time periods. It is important to stress that the costs of environmental regulations shown in Table 5 are denominated in 2001 dollars, the same base year used in the original OMB sources of these estimates. This facilitates comparisons to the OMB reports, and these costs are converted into 2004 dollars in Section IV below.

Table 5. Sources and Estimated Annual Costs of Environmental Regulations

Years Regulations Were Issued	Cost Estimates (Millions of 2001 \$)		Source for Estimate
	Low	High	
Before 1988	85,785	111,746	Hahn and Hird, 1991
1988 - 2000	22,575	80,141	OMB, 2001, Table 2
2000 - 2001	11,380	12,812	OMB, 2002, Table 7
2001- 2002	192	192	OMB 2003, Table 1
2002 - 2003	335	335	OMB 2004, Table 1
2003 - 2004	3,840	4,073	OMB 2005, Table 1-1
Total	124,106	209,299	

OMB discusses the shortcomings in these estimates, including the basic fact that cost estimates do not exist for all environmental regulations, and the inherent difficulties in performing the RIAs. For example, OMB does not include an estimate for the cost of the Superfund program, which is likely to be quite large. To account for some of these shortcomings, OMB provides a range of cost estimates for most regulations, and these are reported in Table 5.

Beginning in its 2003 report, OMB limited its cost summaries to regulations promulgated over the preceding 10 years, which in that report covered 1992 through mid-2002.²⁴ For this reason, this report begins with the OMB report for 2001, which includes its earliest cost accounting and takes the Hahn and Hird (1991) as its beginning estimate of the costs prior to 1988. To account for environmental regulations promulgated since then, the costs of newly reviewed regulations are taken from OMB's annual reports for 2002, 2003, 2004, and 2005.

As shown in Table 5, this puts the cost of environmental regulations in a range between \$124 billion and \$209 billion (in 2001 dollars) or between \$131 billion and \$221 billion when converted into 2004 dollars. This report uses the high end of the cost range

²⁴ U.S. Office of Management and Budget, Office of Information and Regulatory Affairs (2003), *Informing Regulatory Decisions: Report to Congress on the Costs and Benefits of Federal Regulations*, Table 2. OMB's cost estimates rely on regulatory impact analyses (RIAs) issued mainly by the U.S. Environmental Protection Agency.

provided by OMB and Hahn and Hird. This reflects a judgment that cost estimates are absent for important environmental regulations and that government agencies tend to be conservative in estimating regulatory costs.²⁵ For comparison, if the mid-point of the high and low estimates were used, the cost of environmental regulations in this report would decline by roughly \$15 billion, or 10 percent.

4. Tax Compliance

Prior studies of federal regulations stress the substantial burden of paperwork costs on the American public and businesses. In the modern era in which electronic submissions are displacing paper, the term “*paperwork burden*” is actually a metaphor for the time and resources required for recordkeeping, reporting, and compliance with laws and regulations. Of this burden, the time required to comply with the federal tax code accounts for the lion’s share. Of course, the federal government requires a host of additional forms that also impose a recordkeeping and reporting burden. However, these non-tax-related reporting and compliance requirements are largely tied to specific

²⁵ Several regulatory experts draw a similar conclusion about the OMB environmental cost estimates, but considerable debate continues. For example, Johnson concludes that “the costs of water quality regulation totaled \$93.1 billion in 2001. While this figure is based on conservative estimates of regulatory costs, it is significantly larger than the cost and benefit estimates produced by EPA.” (Joseph Johnson, *The Cost of Regulations Implementing the Clean Water Act*, Arlington, VA: Mercatus Center, Regulatory Studies Program Working Paper, April 2004.) In contrast, in 1999, EPA estimated the costs of the 1972 CWA at \$15.8 billion per year. (“A Retrospective Assessment of the Costs of the Clean Water Act: 1972 to 1997,” U.S. Environmental Protection Agency, October 2000.) The discussion in Robert W. Hahn, “Regulatory Reform: What Do the Government’s Numbers Tell Us?” in Robert W. Hahn (ed.) *Risks, Costs, and Lives Saved: Getting Better Results from Regulation*, New York: Oxford University Press and AEI Press, 1996, pp. 208-253, is also informative. Hahn makes a strong case that government agencies overestimate benefits and underestimate costs systematically. In addition, the review article by Jaffe, *et al.*, “Environmental Regulation and the Competitiveness of U.S. Manufacturing,” *Journal of Economic Literature*, Vol. 33 (1), 1995, suggests that environmental costs in the long run have exceeded compliance cost estimates. Finally, the study by Winston Harrington, *et al.* “On the Accuracy of Regulatory Cost Estimates,” *Journal of Policy Analysis and Management*, vol. 19 (2), 2000, examines the estimates for 28 particular rules promulgated by EPA and OSHA and finds, in contrast, that overestimation of unit costs occurs about as often as underestimation.

economic, environmental, or workplace regulations. This means that the cost estimates for the other regulations already account for most of the non-tax-related compliance and reporting burden.

The estimate of the cost of federal tax compliance relies on a 2002 report by the Tax Foundation that provides extensive details about the time required to file federal income tax returns.²⁶ This is a reasonable proxy for total tax compliance because most federal taxes, such as the personal income tax, business taxes (proprietorships, partnerships, and corporations), and social insurance (“payroll taxes”) are included in the Tax Foundation analysis. Combined, these account for more than 90 percent of all federal government revenues.

The basic approach to the computation of tax compliance costs is straightforward and easy to describe. The first step uses data from the Internal Revenue Service on the amount of time required to complete each type of tax form, and the number of filings for each type of form. The number of compliance hours is broken down in Table 6 for businesses, nonprofits, and individual filers. The total number of hours required for compliance is nearly 5.8 billion per year, and American businesses account for roughly half of the total hours.

²⁶ J. Scott Moody, *The Cost of Complying with the U.S. Federal Income Tax*, The Tax Foundation, Washington, DC, July 2002. Moody uses data for 2001, the most recently available.

Table 6. Sources and Estimated Cost of Compliance with the Federal Tax Code^a

	Businesses	Nonprofits	Individuals	Total
Total Hours Required to Comply ^b	2,751,584,615	144,436,032	2,872,837,024	5,768,857,671
Hourly Cost ^c (Dollars)	37.38	37.38	30.08	
Total Compliance Cost (Dollars)	102,856,955,433	5,399,161,787	86,424,407,345	194,680,524,564
Share of Total Compliance Cost (Percent)	53	3	44	100

Sources and Notes:

^a The totals multiplied by the hours may not correspond to the total costs displayed above due to rounding in the data.

^b J. Scott Moody, *The Cost of Complying with the U.S. Federal Income Tax*, The Tax Foundation, Washington, DC, July 2002.

^c U.S. Bureau of Labor Statistics website.

The second step is to multiply these total hours spent on compliance by an hourly wage rate that reflects either the value of the preparer's time (the average hourly wage rate for all workers in the case of individuals) or the hourly compensation rate for a human resources professional (in the case of businesses and nonprofits).²⁷ These wage rates are converted into 2004 dollars. Based on the Tax Foundation raw data and the method described above, the estimated cost of federal tax compliance is nearly \$195 billion (in 2004 dollars). To be clear, this \$195 billion estimate includes the combined costs on individual filers, nonprofit organizations, and business filers.

²⁷ The source of the hourly rate data is the U.S. Bureau of Labor Statistics website: <ftp://ftp.bls.gov/pub/news.release/history/ocwage.11062002.news>

Summary of Total Regulatory Costs

Table 7 summarizes the cost estimates described in this section by regulatory category, and notes the basic sources and procedures behind the estimates.

Table 7. Summary of Regulatory Costs, Sources, and Procedures, 2004 (Billions of 2004 dollars)

	Cost Estimate	Basic Sources and Procedures in Brief
All Federal Regulations	1,113	Summation of costs by category
Economic	591	ITC (2004); OMB (2003, 2004, 2005); Regression Analysis; Hahn and Hird (1991)
Workplace	106	Johnson (2005); GAO (1994)
Environmental	221	Hahn and Hird (1991); OMB (2001, 2002, 2003, 2004, 2005)
Tax Compliance	195	Moody (2004), Bureau of Labor Statistics (2005)

In Table 7 and throughout the remainder of the report, regulatory costs are not reported separately for efficiency and transfer costs. This departs from Crain and Hopkins (2001), which presented two cost estimates, one of which omitted transfer costs and included only efficiency costs. The two cost estimates are not presented in this report simply because the new method used to compute the baseline domestic economic cost yields a combination of the two, and this cost is a large portion of total regulatory costs.

III. Incidence of Regulatory Costs

This section describes how the burden of federal regulations is distributed among major business sectors of the American economy, and, within sectors, how this burden is distributed among firms of different sizes. It begins with a brief quantitative summary of the composition of American enterprise: how the number of firms and the work force are distributed among firms of different sizes and among the major categories of business activities. This underlying composition of economic activity in America is a key element in the study, because it provides the basis for determining the incidence of regulatory costs.

A Snapshot of American Enterprise

The report uses a three-part firm size classification, relying on SBA data on employees per firm:

- Small firms fewer than 20 employees
- Medium-sized firms 20 to 499 employees
- Large firms 500 or more employees.

The North American Industry Classification System (NAICS) devised by the U.S. Census Bureau divides American businesses into 2,000 distinct industry types. In order to make the results tractable, this report distills these classifications down to five broad sectors:

- Manufacturing,
- Trade (wholesale and retail trade),
- Services,
- Health care, and
- Other (a residual containing almost all other nonfarm employers).²⁸

²⁸ The source for these data, the Statistics of U.S. Businesses, covers almost all nonfarm employer businesses. It omits farms, railroads, and most government-owned establishments, the U.S. Postal Service, and large pension, health, and welfare funds (100 + employees) and nonincorporated firms with no paid employees. According to the Census Bureau, nonemployers account for roughly 3 percent of all business activity (see U.S. Census Bureau, "Nonemployer Statistics," <http://www.census.gov/epcd/nonemployer>).

Table 8 shows the distribution of American industry by sector and firm size using the most recently available data (for 2001) from Advocacy.²⁹ Table 8 presents three relevant size indicators: the number of firms, the number of employees, and payroll expenditures.³⁰

²⁹ American industry is obviously not static and these 2001 data on the distribution of business activity do not match up exactly with the years for the regulatory cost data. However, changes in the basic structure of American industry generally occur only incrementally. These data provide a reasonable approximation for the relevant years of the proportions of firms, employees, and payroll across the three firm size categories and the five sector classifications.

³⁰ The Office of Advocacy of the U.S. Small Business Administration contracts with the U.S. Census Bureau to collect the employer firm size data (see <http://www.sba.gov/advo/stats/data.html>). When the Census Bureau compiles its *Statistics of U.S. Businesses*, it relies on survey questionnaires filled out by firms. Occasionally, firms classify themselves under more than one industry type (or NAICS classification). This means that when summed by sector, the number of firms is greater than the actual number of firms. The data used in this report corrects for this overcount using a technique explained in Appendix 4. In brief, the correction relies on the fact that the number of employees in each industry is accurately reported to the Census Bureau, and the share of employees by sector is used to eliminate the redundancy and scale back overcounts of firms.

Table 8. Size Distribution of American Business, 2001*

Sector	Size Measure	All Firms ^a	Firm Size:		
			<20 Employees	20-499 Employees	500+ Employees
All Sectors ^a	Firms	5,657,774	5,036,845	603,562	17,367
	Employment	115,061,184	20,602,635	36,780,814	57,677,735
	Payroll (\$000)	4,207,896,965	636,971,132	1,227,529,545	2,343,396,288
Manufacturing	Firms	296,121	221,803	73,077	935
	Employment	15,950,424	1,255,654	5,382,312	9,312,458
	Payroll (\$000)	651,581,622	39,313,824	192,470,151	419,797,648
Trade	Firms	1,069,244	955,449	112,691	1,536
	Employment	21,032,378	4,245,371	6,082,027	10,704,980
	Payroll (\$000)	623,055,250	115,490,979	211,099,531	296,464,741
Services	Firms	2,941,979	2,632,897	296,045	13,347
	Employment	55,622,909	10,103,762	17,291,599	28,227,548
	Payroll (\$000)	2,103,061,974	300,371,285	539,539,451	1,263,151,237
Health Care	Firms	532,740	472,329	59,805	591
	Employment	14,534,726	2,279,569	4,626,256	7,628,901
	Payroll (\$000)	491,257,415	91,375,483	139,004,398	260,877,534
Other	Firms	817,691	754,368	61,944	958
	Employment	7,920,747	2,718,279	3,398,620	1,803,848
	Payroll (\$000)	338,940,705	90,419,561	145,416,015	103,105,129

Notes to Table 8:

* Source: U.S. Small Business Administration, Office of Advocacy, "Statistics of U.S. Businesses: Firm Size Data," website: <http://www.sba.gov/advo/stats/data.html>. Payroll data are converted into 2004 dollars. The Office of Advocacy contracts with the U.S. Census Bureau to provide employer firm size data. These data for 2001 are the most recently available from the SBA.

^a These Statistics of U.S. Businesses data cover almost all nonfarm employer businesses. Omitted are farms, railroads, and most government-owned establishments, the U.S. Postal Service, and large pension, health, and welfare funds (100 + employees) and nonincorporated firms with no paid employees.

Table 9 organizes the distribution of these same business size indicators in a different, and for the allocation purposes of this section, more useful fashion. There the size measures are converted from the raw data shown in Table 8 into percentage terms.

For example, consider the data in Table 9 that describe the manufacturing sector. That sector accounts for 5 percent of all U.S. firms, 14 percent of all U.S. employees and 15 percent of all U.S. business payroll expenditures. Within the manufacturing sector, 75 percent of the firms are classified as small businesses (fewer than 20 employees), 25 percent have between 20 and 499 employees, and only 0.3 percent has 500 or more employees. Eight percent of manufacturing employees work in small firms, 34 percent work in mid-sized firms, and 58 percent work in large firms. Finally, for the distribution of payroll expenditures, small firms account for 6 percent, mid-sized firms account for 30 percent, and large firms account for 64 percent.

Table 9. Size Distribution of American Business (Percentages)

	Sector Share of All U.S. Industry					
Size Measure	Manufacturing	Trade	Services	Health Care	Other	
No. of Firms	5	19	52	9	14	
Employees	14	18	48	13	7	
Annual Payroll	15	15	50	12	8	
	Percent of Firms, by Sector					
	Manufacturing	Trade	Services	Health Care	Other	All Sectors
<20 employees	75	89	89	89	92	89
20-499 employees	25	11	10	11	8	11
500+ employees	0.3	0.1	0.5	0.1	0.1	0.3
	Percent of Employees, by Sector					
	Manufacturing	Trade	Services	Health Care	Other	All Sectors
<20 employees	8	20	18	16	34	18
20-499 employees	34	29	31	32	43	32
500+ employees	58	51	51	52	23	50
	Percent of Payroll, by Sector					
	Manufacturing	Trade	Services	Health Care	Other	All Sectors
<20 employees	6	19	14	19	27	15
20-499 employees	30	34	26	28	43	29
500+ employees	64	48	60	53	30	56

Source: See Table 8.

The percentages displayed in Table 9 provide a snapshot of the distribution of productive activity among American businesses. It is against this descriptive backdrop that the report charts the incidence of regulatory costs. These costs are allocated across the sectors and firm sizes shown in Table 9 using the procedures described in the remainder of this section.

Assumptions and Procedures Underlying the Cost Allocations

Business Portion of the Regulatory Burden

The first step in the cost allocation procedure separates the regulatory burden that falls initially on business from the burden that falls initially on individuals and state and local governments. As discussed in Section II, the report makes no attempt to trace the subsequent shifting of this burden from business to individuals (*e.g.*, in the form of higher retail prices) or from one business sector to another (*e.g.*, in the form of higher energy or health care costs). It is worth emphasizing that all regulatory costs are — and can only be — paid by individuals, as consumers, as workers, as stockholders, as owners, or as taxpayers. In other words, the distinction between “business” and “individuals” is one that focuses on the compliance responsibility, fully recognizing that ultimately all costs must fall on individuals. Moreover, the degree to which businesses are able to shift compliance costs forward onto consumers can only be determined with highly specific information about the market elasticities. For example, without the price elasticity of demand, we cannot determine with any level of certainty what percentage of the regulatory cost will be shifted forward beyond the statutory incidence.

A second rationale for attempting to apportion costs between businesses and individuals is that distribution of costs across different classes of businesses is potentially quite important from a policy perspective, and the consumer costs cannot be allocated to the different classes of businesses. As a final introductory comment, the methods used to allocate costs between firms and individuals do not double-count costs.

The cost allocations for each type of regulation are as follows:

- Environmental — business 65 percent, other 35 percent
- Economic — business 50 percent, other 50 percent

- Workplace — business 100 percent, other 0 percent
- Federal tax compliance — business 53 percent, other 47 percent

These allocations employ the same methodology used in the 1995 Hopkins study and the 2001 Crain and Hopkins study. The allocation of environmental regulations is based on the compliance data reported by the Environmental Protection Agency.³¹ In the absence of allocation data for economic regulation, a default judgment of 50-50 is applied. Workplace regulations are allocated 100 percent to businesses because these only apply to commercial enterprises. Moreover, this assumption is similar to that used by the Congressional Budget Office that payroll taxes are borne fully by workers (and therefore not shifted forward onto consumers through price increases). The assumption is consistent with the empirical evidence that the labor supply function is relatively inelastic.³² The allocation for federal tax compliance uses the apportionment data from the Tax Foundation study (2002) and shown in Table 6 above.³³

Allocation of Regulatory Costs Across Business Sectors

The second task is to allocate the business portion of regulatory costs among the five major sectors. These five sectors generally follow those in Hopkins (1995) and Crain and Hopkins (2001) to facilitate comparisons over time. The sectors are based on the Census Bureau's North American Industry Classification System (NAISC), in some

³¹ Environmental Protection Agency, "Environmental Investments: The Cost of a Clean Environment," EPA 230-11-90-083, November 1990, pp. 2-5.

³² See the discussion in Jonathon Gruber, *Public Finance and Public Policy*, New York: Worth Publishers, 2004, pp. 539-540.

³³ J. Scott Moody, *The Cost of Complying with the U.S. Federal Income Tax*, The Tax Foundation, Washington, DC, July 2002.

cases aggregating categories.³⁴ For example, the NAICS separates wholesale trade and retail trade, and these are combined in this report. Table 10 lists these allocations by sector and the sources and methods used. A more complete description of the allocation basis for each type of regulation is described in turn.

³⁴ The NAICS data are from the U.S. Census Bureau website:
<http://www.census.gov/epcd/naics02/naicod02.htm>

Table 10. Allocation of Business Regulatory Costs to Sector (Percentages)

Type of Regulation	Sectoral Allocations					Sources (Methods)
	Manufacturing	Trade	Services	Health Care	Other	
Economic	18	15	41	7	19	BEA, 2004 (Sector GDP Value Added Shares of GDP); ITC, 2004 (Price and Output Effects of Trade Restrictions by Sector)
Workplace	14	18	46	13	9	Johnson, 2005 (Costs by Sub-Category); BLS, 2004 (Sector Shares of Unionized Employees); SBA, 2001 (Sector Shares of Employment)
Environmental	54	0	0.3	1	45	Hazilla and Kopp, 1991 (Compliance Costs by Sector)
Tax Compliance	15	15	50	12	8	SBA, 2001 (Sector Shares of Total Payroll Expenditures)

Economic Regulations. Regarding economic regulations, the cost allocations are first computed separately for domestic regulations and regulations affecting international trade, and then aggregated. For domestic regulations, cost shares are allocated based on each sector's value added to GDP divided by total private sector GDP.³⁵ Table 11 lists these sector shares of total private sector GDP (see the second column).

³⁵ The source of the value added to GDP by sector and the private sector GDP data is the Industry Economics Division, Bureau of Economic Analysis (BEA), U.S. Department of Commerce. These data were released on June 17, 2004.

**Table 11. Basis for Allocating Economic Regulations across Business Sectors
(Percentages)**

Business Sector	Domestic Component	International Component
	GDP Valued Added as a Share of Total Private Sector GDP ^a	Output and Price Effects on GDP Valued Added as a Share of Private Sector GDP ^b
Manufacturing	15	51
Trade	15	10
Services	42	31
Health Care	8	1
Other	21	6

Sources for Table 11:

^a Bureau of Economic Analysis (2004).

^b United States International Trade Commission (2004) and author's calculations.

For economic regulations affecting international trade, the report uses the estimated impact on price and output changes by sector as reported by the International Trade Commission (2004, p. 123). The ITC estimates are re-aggregated into the five sector classifications that are used in this report. These sector-specific estimates of changes attributable to trade restrictions are then multiplied by each sector's value added to GDP (source: BEA, 2004). Then these projected changes in GDP value added for each sector are computed as a percentage of the aggregate impact on private sector GDP (that is, the total change in GDP value added from trade restrictions). These percentages are presented in the last column of Table 9.

A final step computes the overall — domestic plus international — sector allocations for economic regulations. For domestic economic regulations, the sector weights for domestic economic regulations (those reported in the second column of Table 11) are multiplied by the business share of the cost of domestic economic regulations (which equals 50 percent of \$536 billion, or \$268 billion). Similarly, the international sector weights (those reported in the last column of Table 11) are multiplied

by the business share of the cost of international economic regulations (which equals 50 percent of \$55 billion, or \$27.5 billion). To compute the final allocation for each of the five sectors (as reported in Table 10 above), the costs of domestic and international regulations are summed and then divided by the total business portion of the cost of economic regulations (= \$295 billion).

Workplace Regulations. The allocation for workplace regulations is based on a decomposition of all workplace regulations into six types. These six types are shown in Table 12, and the specific statutes and executive orders that fall within each are listed in Appendix 2.

Table 12. Basis for Allocating Workplace Regulations across Business Sectors *

(All dollar figures in millions of 2004 dollars)

Type of Workplace Regulation	Manufacturing		Trade		Service		Health Care		Other		Allocation Basis
	Share (Percent)	Cost (Millions of Dollars)	Share (Percent)	Cost (Millions of Dollars)	Share (Percent)	Cost (Millions of Dollars)	Share (Percent)	Cost (Millions of Dollars)	Share (Percent)	Cost (Millions of Dollars)	
Labor Standards	25	362	13	189	14	202	12	173	36	523	Percent Unionized Employment
Labor-Management Relations	25	1,149	13	601	14	642	12	550	36	1,658	
Employee Benefits	14	2,985	18	3,935	48	10,408	13	2,720	7	1,482	Percent U.S. Employment
Occupational Safety and Health	14	7,851	18	10,353	48	27,380	13	7,155	7	3,899	
Civil Rights	14	1,063	18	1,402	48	3,708	13	969	7	528	
Employment Decision Laws	14	1,969	18	2,597	48	6,868	13	1,795	7	978	
All Workplace Regulations	14	15,380	18	19,077	46	49,208	13	13,361	9	9,067	

*** Sources for Table 12:**

Costs of Workplace Regulations by Major Type: Johnson (2001)
 Percent Unionized Employment: U.S. Bureau of Labor Statistics, "Labor Force Statistics" from the Current Population Survey (2004).
 Percent U.S. Employment: U.S. Small Business Administration (reported in Table 9).

For two categories of workplace regulations, labor standards and labor-management relations, the cost allocation uses each sector's share of all U.S. private sector employees represented by a union. For example, of the 9.3 million private sector workers in the U.S. represented by a union in 2003, 2.3 million (25 percent) worked in the manufacturing sector.³⁶ The unionization share is used for the somewhat obvious reason that these two types of regulations largely apply to union wage-related issues (e.g., the Service Contract Act, the Walsh-Healey Act, and the Davis-Bacon Act) and

³⁶ The source for union representation data by sector is the U.S. Bureau of Labor Statistics, "Labor Force Statistics from the Current Population Survey," <http://stats.bls.gov/news.release/union2.t03.htm>.

collective bargaining issues (e.g., the National Labor Relations Act). For the four other types of workplace regulations—employee benefits, occupational safety and health, civil rights, and employment decision laws—the costs are allocated based on each sector’s share of total U.S. employment. (Note that for each specific type of workplace regulation shown in Table 12, the rows sum to 100 percent.) The total workplace regulatory costs for each sector are summed separately (each of the “cost” columns in Table 12) to compute each sector’s share of the total cost of all workplace regulations (=\$106 billion). These final allocation shares are shown in the bottom row of Table 12.

Environmental Regulations. The sector allocations for environmental regulations are taken from Hazilla and Kopp.³⁷ Almost all of these costs fall on the manufacturing sector (54 percent) and the residual, or “other” sector (45 percent). The “other” sector includes such businesses as coal mining, ore mining, oil and gas extraction, coal gasification, and electric utilities, all of which are heavily affected by regulations promulgated under the Clean Air Act and the Clean Water Act. The remaining one percent of environmental costs falls on the health care and service sectors.

Federal Tax Compliance. The allocation of federal tax compliance costs is based on each sector’s share of total U.S. business payroll expenditures.³⁸ These payroll shares are shown in Table 9 above. The rationale underlying this allocation method is that the time and resources devoted to recordkeeping, tax accountants, paperwork, and litigation will be determined largely by payroll expenditures.

³⁷ Michael Hazilla and Raymond Kopp (1990), “The Social Cost of Environmental Quality Regulations: A General Equilibrium Analysis,” *Journal of Political Economy*, Vol. 98 (4), p. 858.

³⁸ The source for the industry payroll data is U.S. Small Business Administration, Office of Advocacy, Statistics of Businesses: Firm Size Data, (reported in Table 9), <http://www.sba.gov/advo/stats/data.html>.

Allocation of Regulatory Costs by Firm Size

The third task involves allocating the costs of regulations by firm size. As noted above, this study adopts a three-division scheme: firms with fewer than 20 employees (“small”), firms with 20 to 499 employees (“medium-,” or “mid-sized”), and firms with 500 or more employees (“large”). The specific allocation procedure differs for each type of regulation, and the procedures are described below.

The firm size allocation formula for economic regulations is based on the share of payroll expenditure within each firm size category (shown in Table 9 above). For example, in the manufacturing sector, small firms generate 6 percent of payroll within the sector, medium-sized firms generate 30 percent, and large firms generate 64 percent. This procedure is used because payroll expenditures are the best available proxy for the economic activity by firm size.

For workplace regulations, the cost allocation among the three firm size groups for each sector uses a two-step procedure. Step one separates the total regulatory costs for the sector into two components, those that apply to all firms and those that explicitly exempt small firms (those with fewer than 20 employees). Appendix 2 denotes the exempt and nonexempt workplace regulations. In step two, for the nonexempt regulations, the procedure follows Hopkins (1995) and Crain and Hopkins (2001) and allocates these costs such that the cost per employee in small firms is 20 percent higher than in medium-sized firms, and the cost per employee in large firms is 20 percent lower than in medium-sized firms. For the regulations that exempt small firms, the costs are allocated solely between the medium-sized and large firms using the same ratio as above (20 percent lower per employee in large firms than in medium-sized firms). The

final allocation then sums the nonexempt and exempt cost components for each firm size category.³⁹

Appendix 5 provides a technical description of the methodology used to allocate the cost of environmental regulations by firm size. In brief, the methodology uses multiple regression analysis to estimate the relationship between pollution abatement costs (PAC) per employee and firm size, measured by the number of employees per firm. The model regresses firm compliance costs per employee against the number of employees, controlling for other factors. The regression results indicate that a one percent increase in firm size (measured in terms of the number of employees) corresponds to a 0.43 percent decrease in pollution abatement costs per employee. In essence, this parameter estimates the degree of economies of scale in compliance costs.

This “economies of scale” parameter value is used to solve for the median cost per employee within each firm size category for each business sector. To state the problem differently, given the economies of scale parameter and the share of employees within each size class, what per employee cost for the three firm size classes would yield the overall sector average cost?

Finally, the costs of tax compliance are allocated across the firm size classifications based on the distribution of compliance hours as reported in the Tax Foundation study.⁴⁰ Appendix 3 provides the details of the methodology for allocating

³⁹ The category of workplace regulations is the one area that applies this judgmental cost allocation used in Hopkins (1995) and Crain and Hopkins (2001). That is, the 20 percent assumption is applied solely to a relatively small segment of all regulations, and therefore the overall results are not very sensitive to this assumption.

⁴⁰ J. Scott Moody, *The Cost of Complying with the U.S. Federal Income Tax*, The Tax Foundation, Washington, DC, July 2002.

costs across firm sizes, and Table 13 summarizes the allocation shares that result from this methodology.

Table 13. Basis for Allocating Tax Compliance Costs Across Firm Sizes *
(Hours in Millions)

Firm Size Category	Manufacturing		Trade		Services		Health Care		Other	
	%	Hours	%	Hours	%	Hours	%	Hours	%	Hours
<20 employees	20	87	24	96	24	324	24	78	24	53
20 to 499 employees	35	148	38	156	31	420	33	106	49	108
500+ employees	45	191	38	156	46	630	43	137	27	60

* **Source:** J. Scott Moody, *The Cost of Complying with the U.S. Federal Income Tax*, The Tax Foundation, Washington, DC, July 2002. The detailed cost allocation methodology is described in Appendix 3.

IV. Principal Findings

This section presents the report's principal findings regarding the total cost of federal regulations and the distribution of this cost across major sectors of the economy, and across firms of different sizes.

A Preliminary Benchmark: Total Federal Regulatory Costs per Household

One way to illustrate the magnitude of the total cost of federal regulations is in relation to the number of U.S. households. Table 14 presents this cost per household data as a benchmark for comparing how the regulatory burden has changed since the Hopkins estimate for 1995 and the Crain and Hopkins estimate for 2000. However, it is important to caution the reader that this particular benchmark includes the total cost of regulations and makes no effort to distinguish between how much of this cost falls on individuals compared with businesses. It simply assumes that households (as consumers, workers, small business owners, shareholders, and so on) ultimately bear the entire burden of regulations. Table 14 further shows the total federal government burden, encompassing federal tax receipts, and how this total burden per household changed between 1995, 2000, and 2004. The data in Table 14 are adjusted for inflation and are expressed in 2004 dollars.

It is important to point out that the figures in Table 14 for the year 2000 estimates (in Crain and Hopkins (2001)) represent two major revisions to the original estimates reported in Crain and Hopkins (2001). First, Crain and Hopkins (2001) used estimates from the U.S. Census Bureau for the number of U.S. households for 2000. New data based on the 2000 census have been released since that report, and the updated data for the number of households are used in Table 14. This update raised the number of households by 2.3 million, a two percent increase. Second, the cost of regulations were

revised, and the combined effect of the revisions raised the original estimate by \$38 billion (converted to 2004 dollars), a 4 percent upward revision relative to the original cost estimate.⁴¹ The revisions to the cost estimates raise the business portion of all regulations by \$24 billion, or 4 percent.

More specifically, the upward revision in the costs is based on two specific changes to the estimates originally reported in Crain and Hopkins (2001). First, the cost of economic regulations is revised using the new regression-based methodology described in Section II. The regression parameter that relates the cost of domestic economic regulations to GDP is used for the baseline, supplemented by the OMB cost estimates for economic regulations specifically omitted from the OECD *Index*. In essence, the methodology used to estimate the cost of economic regulations in the present study for 2004 is used to re-estimate the cost for 2000. This change increases the cost of economic regulations by \$28 billion (a 6 percent increase) relative to the figure reported in Crain and Hopkins (2001) after adjusting to 2004 dollars. The second adjustment raises the cost of workplace regulations by \$10 billion (an 11 percent increase) relative to the cost reported in Crain and Hopkins (2001) after adjusting into 2004 dollars. This change reflects more comprehensive data about these costs as the study by Johnson (2005) was completed. Appendix 7 shows these revisions and the figures originally reported by Crain and Hopkins (2001).

⁴¹ Appendix 7 describes these revisions and presents further details about how they compare to the original estimates for 2000 that were reported in Crain and Hopkins (2001).

Table 14. Total Federal Regulatory Costs and Federal Receipts per Household (HH), 2004, 2000, and 1995 ^a

Year	Households (Millions)	Federal Receipts per HH ^b	Total Regulatory Costs per HH	Combined Federal Burden per HH
2004	109	\$17,187	\$10,172	\$27,359
2000	106	\$21,050	\$9,126 ^c	\$30,176
1995	98	\$17,004	\$8,437 ^d	\$25,441
Annualized Compound Growth Rate: 2000 to 2004 (Percent)	0.9	-5.1	2.7	-2.5
Annualized Compound Growth Rate: 1995 to 2000 (Percent)	1.4	4.3	1.6	3.4

Notes to Table 14:

^a All dollar amounts are converted into 2004 dollars.

^b Federal Receipts by fiscal years, including Social Security. Source: CBO Web Site:
<http://www.cbo.gov/showdoc.cfm?index=1821&sequence=0>

^c Source: Crain and Hopkins, 2001. This estimate for 2000 adjusts the cost originally reported in Crain and Hopkins upward by \$37 billion to be consistent and comparable with the calculation methods and sources introduced in this report. Specifically, these new methods and sources affect the estimated costs of the economic and workplace regulations components, revising upward the estimates reported in Crain and Hopkins (2001) by roughly 4 percent. The number of households for 2000 is revised using the final data for the 2000 Census. Additional detail on the 2000 revisions is provided in the text and in Appendix 7.

^d Source: Hopkins, 1995

As shown in Table 14, the total cost of federal regulations per household reached \$10,172 in 2004, an increase of more than \$1,000 per household since 2000 (in inflation adjusted, 2004 dollars). Between 2000 and 2004, the inflation-adjusted cost per household grew at an annualized rate of 2.7 percent, as compared with the 1.6 percent

growth rate from 1995 to 2000. In essence, the total regulatory burden per household continued to grow, and to grow at an accelerating rate.

Interestingly, while the cost of federal regulations grew between 2000 and 2004, real federal government receipts per household declined by 20 percent, a 5.1 percent drop on an annualized basis (see the second column of Table 14). This meant that over the 2000 to 2004 period, the combined federal burden (regulatory costs plus federal taxes) experienced a net decline per household.

Distribution of Federal Regulatory Costs: Businesses and Others

Table 15 shows the estimated costs of all federal regulations, broken down by type, and the distribution of the burden between business and others (*i.e.*, individuals and state and local government).

Table 15. Total Cost of Federal Regulations in 2004 by Type and Business Portion (Billions of 2004 Dollars)

	Total Costs (Billions of Dollars)	Business Portion		Others	
		Share (Percent)	Amount (Billions of Dollars)	Share (Percent)	Amount (Billions of Dollars)
All Federal Regulations	1,113	58	648	42	465
Economic	591	50	295	50	295
Workplace	106	100	106	0	-
Environmental	221	65	144	35	77
Tax Compliance	195	53	103	47	92

These estimates in Table 15 indicate that the annual total cost of all federal regulations in 2004 was \$1.113 trillion. Of this amount, the annual direct burden on business is \$648 billion. Economic regulations represent the most costly category, with a total cost of \$591 billion, and with \$295 billion falling initially on business. Environmental regulations represent the second most costly category in terms of total cost (\$221 billion), and the cost apportioned to business is \$144 billion. Compliance with the federal tax code is the third most costly category in terms of total costs (\$195 billion), and the fourth most costly in terms of the burden on business (\$103 billion). The cost of workplace regulations ranks last in terms of total cost (\$106 billion), but because business bears all these costs, workplace regulations are the third most costly for the business sector (\$106 billion).

Distribution of the Regulatory Burden across Business Sectors: Three Metrics

Table 16 further deconstructs the business portion of regulatory costs by sector and for the four categories of regulations. Three measures of the regulatory burden are employed to assess the cost distribution among business sectors: cost per firm, cost per employee, and cost as a share of payroll expenses.

Table 16. Average Sectoral Regulatory Costs, 2004 (In 2004 Dollars)

	Total Costs (Billions of Dollars)	Cost per Firm (Dollars)	Cost per Employee (Dollars)	Cost as a Share of Payroll (Percent)
Total	162	548,077	10,175	25
Economic	54	181,121	3,363	8
Workplace	15	51,937	964	2
Environmental	77	261,234	4,850	12
Tax Compliance	16	53,786	999	2
Trade				
Total	78	72,737	3,698	12
Economic	43	40,652	2,067	7
Workplace	19	17,842	907	3
Environmental	0	0	0	0
Tax Compliance	15	14,244	724	2
Services				
Total	221	75,174	3,976	11
Economic	120	40,829	2,160	6
Workplace	49	16,726	885	2
Environmental	0	145	8	0.02
Tax Compliance	51	17,474	924	2
Health Care				
Total	47	88,551	3,246	10
Economic	21	39,117	1,434	4
Workplace	13	25,080	919	3
Environmental	1	1,813	66	0.2
Tax Compliance	12	22,540	826	2
Other				
Total	140	170,835	17,636	41
Economic	57	70,134	7,240	17
Workplace	9	11,089	1,145	3
Environmental	65	79,480	8,205	19
Tax Compliance	8	10,132	1,046	2
U.S. Totals (All U.S. Businesses)				
Total	648	114,550	5,633	15
Economic	295	52,212	2,567	7
Workplace	106	18,752	922	3
Environmental	144	25,406	1,249	3
Tax Compliance	103	18,180	894	2

As shown in Table 16, considering all U.S. businesses and all federal regulations, the total cost to the typical U.S. firm is nearly \$115,000. The cost per employee for the typical U.S. firm is about \$5,633. As a percent of firm payroll expenditures, the cost of all regulations in the typical U.S. firm equals 15 percent. To place this amount in perspective, it exceeds the employer contribution to the payroll tax for Social Security (OASDHI) and Medicare, which is 7.65 percent of wages. Indeed, 15 percent of payroll expenditures comes very close to the combined payroll taxes for OASDHI and Medicare paid by employers and employees, or self-employed individuals, which equals 15.3 percent.

The three cost metrics shown in Table 16 reveal several noteworthy patterns in how the cost burden of regulations is distributed among the business sectors. Table 17 shows these patterns a bit more clearly by ranking the five sectors in terms of the relative cost burden.

Table 17. Sector Rankings Based on Three Metrics of the Regulatory Burden (In 2004 Dollars. 1=highest burden; 5=lowest burden)

Sector Category	Cost Per Firm (Dollars)	Cost Per Firm (Rank)	Cost Per Employee (Dollars)	Cost Per Employee (Rank)	Cost / Payroll (Percent)	Cost / Payroll (Rank)
Manufacturing	548,077	1	10,175	2	25	2
Other	170,835	2	17,636	1	41	1
Health Care	88,551	3	3,246	5	10	5
Services	75,174	4	3,976	3	11	4
Trade	72,737	5	3,698	4	12	3

As illustrated by the rankings in Table 17, the manufacturing sector and the “other” sector bear the largest regulatory burden by all three metrics. For example, using the “cost per firm” metric as a gauge, the distribution of the regulatory burden is heavily

skewed toward these two sectors. The manufacturing sector in particular bears the highest total regulatory burden in terms of the cost per firm. The burden on the manufacturing sector (\$548,077 per manufacturing firm) exceeds the burden on the second most costly sector (the “other” category at \$170,835 per firm) by a factor of three. However, by the other two metrics — cost per employee and cost as a percent of payroll — the “other” category bears the highest burden. The cost per employee for firms in the “other” category is \$17,175 as compared with the second highest sector (manufacturing) where the cost per employee is \$10,175. The difference between the rankings based on cost per firm versus cost per employee is likely explained by the fact that these two sectors operate with different mixes of capital and labor. For example, among the “other” category are public utilities, firms that require huge capital investments relative to the number of employees. This means that the regulatory cost per worker rises in this sector relative to manufacturing establishments that typically have more employees per unit of capital investment than public utilities do.

The second conclusion from the metrics in Table 17 is that regulatory costs are distributed much more evenly among the three remaining sectors: health care, services, and trade. In terms of the cost per firm, the burden on the health care sector is 18 percent higher than the service sector and 22 percent higher than the trade sector. However, in terms of the cost per employee, the burden on the health care sector is 18 percent less than on the service sector, and 12 percent less than on the trade sector. When the regulatory burden is gauged by “cost as a percent of payroll,” the health care sector fares slightly better than the service sector and the trade sector. In summary, some conclusions about the distribution of the regulatory burden among sectors depend on which metric one favors. However, the metrics uniformly indicate that the

manufacturing sector and the “other” sector bear substantially higher regulatory costs compared with the health care, service, and trade sectors of the economy.

The Distribution of Regulatory Costs by Firm Size

The distribution of regulatory costs among different firm size categories is presented in Table 18.

Table 18. Business Regulatory Costs in Small, Medium-sized and Large Firms, 2004 (Cost per Employee in 2004 Dollars)

Type of Regulation	Firm Size			
	All Firms	<20	20-499	500+
Manufacturing				
Total	10,175	21,919	10,042	8,748
Economic	3,363	2,577	2,943	3,711
Workplace	964	1,014	1,099	879
Environmental	4,850	15,747	4,970	3,391
Tax Compliance	999	2,582	1,030	767
Trade				
Total	3,698	3,640	4,422	3,309
Economic	2,067	1,898	2,421	1,932
Workplace	907	899	1,042	834
Environmental	0	0	0	0
Tax Compliance	724	843	959	544
Services				
Total	3,976	3,790	3,710	4,205
Economic	2,160	1,698	1,782	2,556
Workplace	885	872	1,012	810
Environmental	8	21	7	4
Tax Compliance	924	1,200	909	835
Health Care				
Total	3,246	4,085	3,238	3,000
Economic	1,434	1,700	1,275	1,451
Workplace	919	926	1,048	838
Environmental	66	181	57	39
Tax Compliance	826	1,277	859	672
Other				
Total	17,636	23,162	14,638	15,301
Economic	7,240	5,628	7,239	9,671
Workplace	1,145	1,103	1,253	1,002
Environmental	8,205	15,699	4,955	3,381
Tax Compliance	1,046	732	1,191	1,246
Total, All U.S. Businesses				
Total	5,633	7,647	5,411	5,282
Economic	2,567	2,127	2,372	2,952
Workplace	922	920	1,051	841
Environment	1,249	3,296	1,040	710
Tax Compliance	894	1,304	948	780

*** Note for Table 18.**

The cost per employee for all U.S. business is computed using the employment shares to weight the costs in each of the five respective sectors.

Considering first the aggregate results for all federal regulations and all business sectors (the last category in Table 18), regulations cost small firms an estimated \$7,647 per employee annually.⁴² Regulations cost medium-sized firms \$5,411 per employee and large firms \$5,282 per employee. Overall, the cost per employee is 41 percent higher in small compared with medium-sized firms and 45 percent higher in small than in large firms. It is noteworthy that these cost differences in 2004 have narrowed since 2000, but only slightly. Using the revised Crain and Hopkins (2001) costs estimates as reported in Appendix 7, the cost per employee was roughly 50 percent higher in small firms than in medium-sized and large firms. Thus, the relevant drop in the disproportionality rate between 2000 and 2004 is slight, 5 percent.

The distribution of compliance costs with respect to firm size classes differs across the five major business sectors. Table 19 reports the percentage difference in the cost per employee in small firms versus larger firms by sector. That is, Table 19 restates the numbers in Table 18 in terms of the cost burden on small firms relative to the firm size categories.

⁴² The U.S. total figures are based on a weighted average of the costs in the five business categories. The weights for each average use the share for the respective category. For example, for the “cost per firm” value, the cost per firm in each sector is weighted by the share of all U.S. firms in that sector. For the “cost as a percent of payroll” value, the sector values are weighted by the share of all U.S. payroll expenditures in that sector, and so on.

Table 19. Difference between Regulatory Costs in Small Firms Relative to Medium-sized and Large Firms, 2004* (Percentages)

Business Sector	Small Firms Relative to Medium-Sized Firms	Small Firms Relative to Large Firms
Manufacturing	118	151
Trade	-18	10
Services	2	-10
Health Care	26	36
Other	58	51
All Sectors	41	45

*** Note to Table 19:**

The figures reflect total the percentage difference between regulatory costs per employee in a small firm versus a medium-sized or large firm based on the data reported in Table 18.

The disproportionate cost burden on small firms is particularly large for the manufacturing sector. In that sector the estimated cost per employee for small firms is 118 percent higher than in medium-sized firms (\$21,919 versus \$10,042), and 151 percent higher than in large firms (\$21,919 versus \$8,748). Two types of regulations, environmental and tax compliance, drive the cost disadvantage faced by small manufacturing firms (see the breakdown by type of regulation in Table 18). The cost of workplace regulations is 8 percent less in small manufacturing firms compared with medium-sized manufacturers, and 15 percent higher in small compared with large manufacturing firms. With regard to economic regulations, the burden falls disproportionately on large manufacturing firms. The burden of economic regulations on small firms is 12 percent lower than on medium-sized firms and 31 percent lower than on

large firms.⁴³ However, while some types of regulations disadvantage large firms relative to small, the combined impact of all regulations in the manufacturing sector puts the heaviest burden by far on small firms.

The distribution of the regulatory burden among firms of different sizes in the “other” category is similar to that in the manufacturing sector, although the overall cost differentials are less extreme than in the manufacturing sector. The cost per employee is 58 percent higher in small firms than in medium-sized firms, and 51 percent higher than in large firms. The health care sector exhibits a similar distribution. In that sector, the cost per employee is 26 percent higher in small firms than in medium-sized firms, and 36 percent higher than in large firms.

The regulatory burden is distributed most evenly with respect to firm size in the services sector (see Table 19). In that sector the total cost per employee for small firms is only 2 percent larger than the cost in medium-sized firms, and 10 percent less than the cost in large firms. In the trade sector, small firms face a 10 percent heavier cost burden than large firms, but have an advantage over medium-sized firms. That is, within the trade sector, the highest total regulatory cost falls on medium-sized firms.

Summary Comments

The cost disadvantage on small business in each sector is driven largely, but not entirely, by compliance with environmental regulations and with the federal tax code. However, the particular cost drivers differ somewhat across the five business sectors. Moreover, not all regulations fall more heavily on small firms than on larger firms. The cost of economic regulations falls most heavily on large firms in every sector except

⁴³ The relatively large impact of economic regulations on large firms has been noted by a number of scholars. See the literature review in Steven C. Bradford, “Does Size Matter? An Economic Analysis of Small Business Exemptions from Regulation,” *The Journal of Small and Emerging Business Law*, 8 (1), 2004, pp. 1-37.

health care and trade. The cost of workplace regulations generally falls most heavily on mid-sized firms, which most likely reflects the fact that many workplace regulations explicitly exempt small firms. Finally, small manufacturing firms are the most disadvantaged by federal regulation relative to larger firms.

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Appendix 1. The Costs of Domestic Economic Regulations

Table A-1. OECD Cross-Country Data Set Used to Estimate the Regression Model

Country ^a	OECD Economic Regulation Index	GDP per Capita (1998-02) ^b	GDP per Capita Growth Rate (1998- 02) ^b	GDP per Capita (1988) ^b	International Trade / GDP (1998-02)	Primary Education (1998-02)	Ethno- linguistic Diversity Index
Australia	1.3	23713	0.023	18558	42.7	102	32
Austria	2.1	31192	0.055	25626	92.7	103	13
Belgium	2.4	30506	0.019	24204	157.0	104	55
Canada	1.1	22605	0.027	19349	83.7	98	75
Denmark	2.3	38136	0.016	31517	76.8	102	5
Finland	2.1	31246	0.027	25682	71.1	100	16
France	2.3	29744	0.020	24663	52.3	105	26
Germany	1.4	32256	0.012	27196	62.6	105	3
Greece	3.1	13181	0.036	10606	51.5	99	10
Ireland	0.8	27282	0.065	13050	169.2	119	4
Italy	3.5	20710	0.015	17339	52.2	102	4
Japan	1.4	44154	0.003	36301	19.6	101	1
Korea	2	12844	0.064	7038	82.2	100	0
Mexico	1.5	3685	0.012	3024	61.9	113	30
Netherlands	2.1	30720	0.014	23159	121.9	108	10
New Zealand	1.4	17979	0.030	15480	65.2	100	37
Norway	2.7	37934	0.011	28241	73.9	101	4
Portugal	2.5	12756	0.021	8935	72.2	122	1
Spain	2.1	17197	0.023	12879	58.6	105	44
Sweden	1.3	30873	0.026	26634	84.6	110	8
Switzerland	1.9	46330	0.010	43375	82.6	107	50
Turkey	3.1	2947	-0.012	2457	55.7	101	25
United Kingdom	0.6	22153	0.021	17676	55.7	99	32
United States	1	31296	0.015	25324	24.8	101	50

Note to Table A-1:

Sources: OECD (1999b) and World Bank (2004)

^a Three Member countries (the Czech Republic, Hungary, Poland) were dropped from the analysis because data were missing on one or more of the variables used in the model.

^b Denominated in terms of 1995 U.S. dollars.

Summary Description of the OECD Index of Economic Regulations

In 1998, the OECD initiated a project to collect and format data on regulation in individual member countries and to summarize these data to enable cross-country

comparisons. The purpose of this initiative was to describe the variability of regulatory approaches across countries and to analyze the interactions between various sets of regulations' provisions. This OECD project involved (a) the construction of a database of internationally comparable data on certain economy-wide and industry-specific regulations; and (b) the estimation of indicators of regulation that summarize (at different levels of detail) the information on the regulatory environments characterizing OECD countries.

The OECD distributed a *Regulatory Indicators Questionnaire* to member countries in 1998. This questionnaire gathered quantitative and qualitative information on more than 1,500 different regulatory provisions concerning economy-wide and sector-specific laws, regulations, and administrative procedures. The response rate was high, and OECD and government experts checked the data collected. OECD used the responses to the questionnaire as well as other sources to establish an international regulation database. To achieve a reasonable level of international comparability, the analysis adhered to several principles. First, the basic data were harmonized, eliminating as much as possible spurious cross-country differences. Second, the regulatory environment was characterized with reference to a large set of individual regulatory provisions. Third, the metric chosen made it possible to rank countries on each of the regulatory provisions according to a common and interpretable scale. Finally, the large set of provisions composing each of the regulatory families and the overall regulatory environment was synthesized into a set of summary measures.

The database provides a "snapshot" of regulatory environments in (or around) 1998. OECD notes that, in some cases "dynamic" elements were included to account for recent reform tendencies, such as privatization policies, administrative simplification programs, and improvements in the flexibility of certain regulations. The information contained in the database was further analyzed to construct summary indicators of

regulation. The resulting OECD indicators of economic regulation include a wide range of constraints and incentive mechanisms concerning market access, the use of inputs, output choices, and pricing. The indicators thus include economic and administrative regulations that affect product markets, but ignore other important regulatory areas (such as environmental and health and safety regulations).

As a final note, the OECD indices are cardinal measures, increasing along a 0-6 scale with the degree of restrictions they impose on market competition. The summary indicators were then constructed, aggregating the various features by means of multivariate data analysis techniques. An exhaustive description of the project and the computations of the regulatory index are contained in OECD, 1999b and OECD, 2000.

The specific business sectors covered in the OECD questionnaire and the subsequent *International Regulation Database* are listed in Table A-2.

**Table A-2. Business Sectors Covered in the OECD Questionnaire and the
*International Regulation Database***

Tobacco manufactures
Petroleum refineries
Basic metal industries
Manufacture of fabricated metal products, machinery and equipment
Electricity
Gas manufacture and distribution
Water works and supply
Wholesale trade
Restaurants and hotels
Railways
Urban, suburban and interurban highway passenger transport
Other passenger land transport
Road freight
Supporting services to land transport
Water transport
Supporting services to water transport
Air transport carriers
Supporting services to air transport
Communication
Financial institutions
Insurance
Business services
Medical, dental and other health services
Motion picture distribution and projection

Appendix 2. Statutes and Executive Orders Governing Workplace Regulations

Source: U.S. General Accounting Office, *Workplace Regulation*, 1994

An asterisk indicates that firms with less than 20 employees are explicitly exempted.

Labor Standards:

- Fair Labor Standards Act (FLSA)
- Davis-Bacon Act
- Service Contract Act
- Walsh-Healey Act
- Contract Work Hours and Safety Standards Act
- Migrant and Seasonal Agricultural Worker Protection Act

Employee Benefits:

- * Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA)
- Family and Medical Leave Act (FMLA)
- Employee Retirement Income Security Act (ERISA)
- Unemployment Compensation Act

Labor-Management Relations:

- National Labor Relations Act (NLRA)
- Labor-Management Reporting and Disclosure Act (LMRDA)

Occupational Safety and Health

- Occupational Safety and Health Act (OSHA)
- Federal Mine Safety and Health Act (MSHA)
- * Drug Free Workplace Act
- Omnibus Transportation Employee Testing Act (OTETA)

Civil Rights:

- Equal Pay Act
- * Title VII of the Civil Rights Act of 1964
- * Age Discrimination in Employment Act (ADEA)
- * Americans with Disabilities Act (ADA)
- Executive Order 11246
- Rehabilitation Act of 1973

Employment Decision Laws:

- Polygraph Protection Act
- Immigration Reform and Control Act (IRCA)
- * Worker Adjustment and Retraining Notification Act (WARN)

Appendix 3. Methodology Used to Allocate the Tax Compliance Costs Across Firm Size Classifications

Table A-4 details the number of hours required to comply with the various types of federal tax forms. The total number of hours required by all American business is nearly 2.8 billion.

Table A-4. Basic Data on Business Forms from the Tax Foundation Study *

Category and Type of Business Form	Compliance Time (Hours)
Sole Proprietorships	
Form 1040	266,688,512
Sch C	165,098,846
Sch C-EZ	4,303,410
Sch F	10,027,217
Sch SE	25,608,743
4835	3,206,549
8829	5,080,655
Subtotal	480,013,932
Partnerships	
Form 1065	269,569,085
Sch D	27,942,395
Sch K-1	118,420,600
Sch L	38,892,245
Sch M-1	9,287,095
Sch M-2	7,583,785
Subtotal	471,695,205
Corporations	
Form 1120	478,563,165
1120A	32,534,965
1120S	438,388,583
1120X	258,720
1120F	5,879,033
1120FSC	983,895
1120H	4,326,413
1120POL	213,580
1120RIC	1,477,292
7004	29,861,318
4626	16,749,108
Sch D	43,560,540
Sch H	1,752,066
Sch PH	3,690,992
Sch D	87,087,475
Sch K-1	94,921,592
4562	559,626,740
Subtotal	1,799,875,477
All Businesses Compliance Hours	2,751,584,614

* **Source:** J. Scott Moody, *The Cost of Complying with the U.S. Federal Income Tax*, The Tax Foundation, Washington, DC, July 2002.

Methodology Used to Allocate Compliance Costs Among Business Sizes

All of the hours spent by “sole proprietorships” are allocated to small firms (those employing 0-19 persons). It is slightly more complicated to allocate the hours spent by “partnerships” and “corporations.” Of the number of hours spent by partnerships, some are allocated to small firms (those employing 0-19 persons) and some are allocated to medium-sized firms (those employing 20-499 persons). This allocation is based on the proportion of all firms employing 0-499 persons that employ 0-19 and the proportion employing 20-499 persons. The hours spent by partnerships on federal tax compliance are then allocated based on these two fractions.

A similar procedure is followed for corporations. Some of the hours spent by corporations are allocated to medium-sized firms (those employing 20-499) and some are allocated to large firms (those employing 500+). Here, the firms (within each sector) employing 20+ persons are divided into two subcategories, those employing 20-499 and those employing 500 or more. Two fractions are computed, one for the percentage of firms employing 20+ that employ 20 to 499 workers, and the other for the percentage of firms employing 20+ that employ 500 or more workers. The hours spent by corporations on federal tax compliance are then allotted to medium-sized and large firms based on these two fractions.

The total number of hours spent complying with the federal tax code is allocated across sectors based on each sector’s share of the nation’s total annual payroll for all businesses. This allocation rule based on annual payroll expenditures is imperfect because the SBA payroll data omit “nonemployers,” and most sole proprietorships are nonemployers. According to the Census Bureau, nonemployers account for roughly 3 percent of all business activity. At the same time, nonemployers account for nearly three-fourths of all businesses. The resulting bias on the cost allocation is clear, if one chooses to define the nonemployer proprietor as an “employee.” Omission of

nonemployer small firms lowers the total allocation to that size class, and the costs within the small firm class are higher than they would be if nonemployer firms were included.

The hourly cost of tax compliance for each business sector and each firm size category is converted into a dollar figure using the wage rate for “human resource managers” published by the U.S. Bureau of Labor Statistics. The most recently available wage rate (for 2001) is \$37.38 when converted into 2004 dollars. This wage rate is multiplied by the number of hours allocated to each sector and each firm size category to compute the respective business costs of tax compliance.

Appendix 4. Methodology Used to Correct Overcount of Firms in the SBA Data

When the Census Bureau compiles its Statistics of U.S. Businesses, it relies on survey questionnaires filled out by firms. Occasionally the firms classify themselves under more than one industry. Because some firms are redundantly classified, the sum of the firms within each category is actually greater than the entire number of firms.

To correct for this overcount, the number of redundantly counted firms is calculated by summing the number of firms by industry and subtracting the total number of firms from this across-industry sum.

The next task is to assign a certain fraction of overcounted firms to each industry to be used as a reduction factor. This is accomplished using the fact that the number of employees within each industry is accurately measured. Each industry's share of the total work force is calculated; these shares are then used to allocate the overcounted firms to each industry. From there, it is a simple matter of subtracting the overcount within each industry from the reported count in each industry. This ensures that the total number of firms is equal to the number of firms summed across the five industry categories.

Appendix 5. Methodology for Estimating Economies of Scale in Environmental Compliance Costs

Introduction

In 2003, environmental regulations cost an estimated \$147 billion (15 percent of total regulatory costs), and the cost falling on businesses was an estimated \$96 billion (16 percent of total business regulatory costs). This appendix describes the methodology used to estimate of the relationship between firm size and compliance costs for environmental regulations. This methodology is adopted from Crain and Hopkins (2001), and the objective is to provide a basis for allocating the cost of environmental regulations among the three firm size categories.

The relationship between compliance costs and firm size is estimated using pollution abatement expenditures by manufacturing firms. For reasons described below the data used in the analysis are for 1992. Among environmental regulations, pollution abatement expenditures account for about one-fourth of the costs. Thus, a reliable estimate of scale economies in pollution abatement provides a reasonable approximation for the general distribution of all environmental regulatory costs.

Estimation Procedure and Results

The general approach is to estimate the relationship between pollution abatement cost (PAC) per employee and firm size, here measured by the number of employees per firm. Equation (2) specifies the estimation equation, which is estimated in log form:

$$(Eq. 2) \ln(\text{PAC} / \text{employee})_{i,s} = \beta \ln(\text{Firm Size}_{i,s}) + \phi \ln(\text{Value of Sales}_{i,s}) + \gamma_i + \varepsilon_{i,s}$$

where subscript i stands for a specific industry type and subscript s stands for a specific American state. Industry types are defined by two-digit SIC codes covering all industries in the manufacturing sector; see Table A-7 below for a description of the 20 industries included. Each continuous variable is entered into Equation (2) as a natural logarithmic transformation (\ln).

In Equation (2) the dependent variable, $(\text{PAC} / \text{employee})_{i,s}$, measures the average pollution abatement expenditure per employee in industry i in state s in 1994 (source: Bureau of the Census, 1996). These are the most recently available data, as Census no longer collects this series. These expenditure data include capital expenses and operating expenditures. The main independent variable of interest, firm size i,s , measures the average number of employees per firm in industry i in state s (source: Bureau of the Census, *1992 Economic Census*). The estimated coefficient on firm size, β , thus provides the measure of economies of scale. Specifically, how does pollution abatement expenditure per employee respond to changes in firm size? Equation (2) also includes a control variable for the average value of sales, and a fixed-effects variable, γ_i , which seeks to control for other factors that cause pollution abatement costs to differ among the 20 industries. For example, the chemical industry may simply be subject to different environmental standards than, say, the leather products industry. Including the fixed-effects dummy variables in the model allows the cost function to shift for each specific industry. $\varepsilon_{i,s}$ is the regression error term, which is assumed to be normally distributed.

Equation (2) is estimated across states using data for 1992. While the Census Bureau continued to survey pollution abatement expenditures through 1994, 1992 is used because the Census of Manufacturing (the source of the state-level data on firm

sizes, employment, and sales) also occurred in that year (the Census of Manufacturing is conducted only every five years).

Results

Table A-5 presents the regression results. Overall, the regression model demonstrates considerable explanatory power. The F-statistic is significant at the one-percent confidence level, and the model explains 83 percent of the variation in pollution abatement expenditures per employee. The estimate of β , -0.431 , is significant at the 0.07 confidence level. This parameter value indicates that a one percent increase in firm size (the number of employees) corresponds to a 0.431 percent decrease in abatement costs per employee. (Recall that the variables are entered as log transformations, so the estimated coefficient indicates the elasticity.) The control variable for the value of sales is significant at the 0.01 level. Finally, the F-statistic allows us to reject the hypothesis that the coefficients on the industry-specific dummy variables are jointly equal to zero. In other words, not surprisingly, the fixed-effects variables pick up significant differences in costs among the various industries.

Table A-5. Regression Results: Economies of Scale in Compliance Costs: Environmental Regulations

Dependent variable: Pollution Abatement Expenditure per Employee

Independent Variable	Coefficient	Std. Err.	t-stat	P> t
ln (Number of Employees)	-0.431	0.243	-1.78	0.07
ln (Value of Shipments)	0.698	0.186	3.75	0.00
Constant	-2.494	2.28	-1.10	0.28

Notes to Table A-5:

Number of observations = 208
 Adjusted R-squared = 0.83
 Regression F-stat (2, 188) = 10.84
 Fixed Industry Effects, F-stat (17, 188) = 18.43

Figure A-1 presents the relationship between pollution abatement expenditures and firm size graphically, plotting the fitted values generated from the estimates in Table A-5. This figure vividly illustrates the presence of economies of scale in these compliance cost data.

Following the firm classification scheme used throughout this study (as well as the 2001 Crain and Hopkins study and the 1995 Hopkins study), the predicted costs per employee are computed for three broad categories of firm sizes: firms with fewer than 20 employees (“small firms”), firms with 20 to 499 employees (“medium-sized firms”), and firms with 500 or more employees (“large firms”). These costs are also shown in Table A-6. The relative costs across these three firm size categories for the earlier time period establish the basis for allocating the cost of environmental regulations in 2003.

Economies of Scale in Pollution Abatement Costs
US Manufacturers

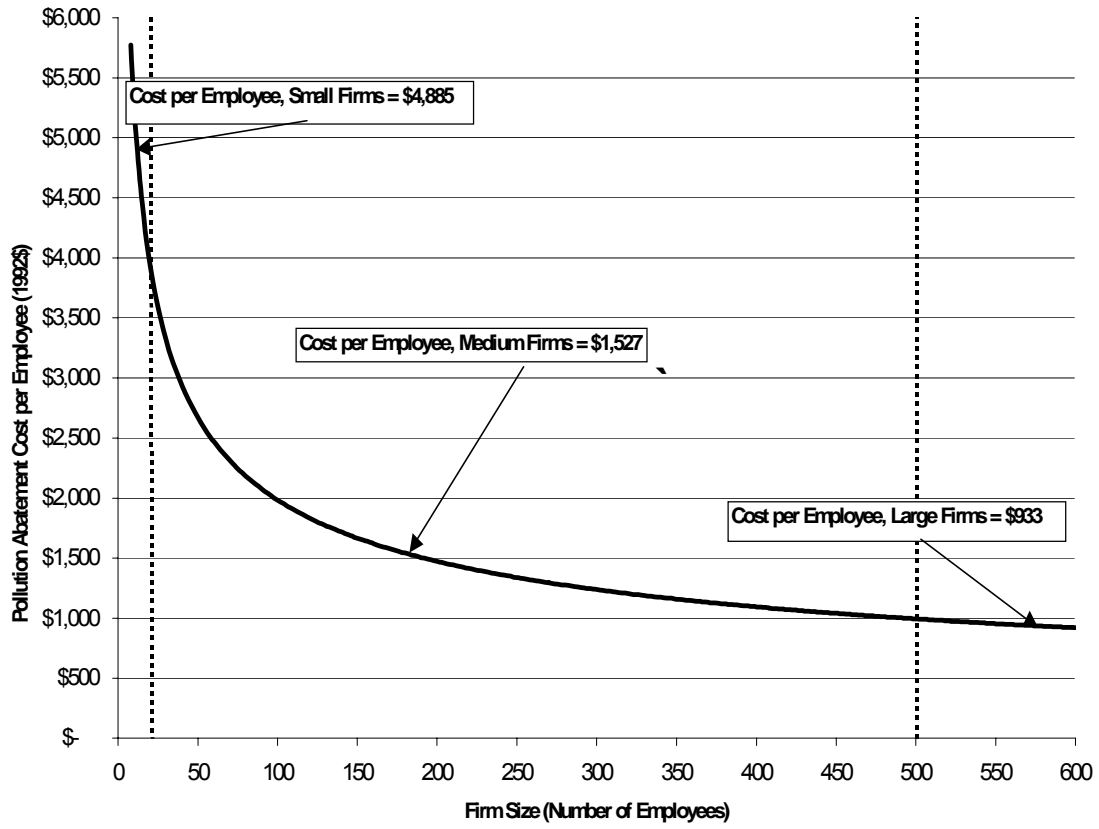


Figure A-1

**Table A-6. Results on Environmental Compliance Costs by Firm Size
(1995 Dollars)**

	Cost per Employee, Manufacturing Sector Firms with:		
	<20 Employees	20 to 499 Employees	500+ Employees
Values Using Eq. 2	5,306	1,659	1,013

Concluding Comments

The 1995 study by Hopkins provides the most comprehensive assessment to date on the incidence of regulatory costs by sector and firm size. However, as he points out, he was forced to rely on a judgmental approach to the cost allocations across firm sizes in the absence of specific empirical estimates. This appendix provides the basis used in this report (and in Crain and Hopkins, 2001) to allocate the costs of environmental regulations among the different firm size classes.

Table A-7. Sectors Included in the Regression Analysis of Environmental Compliance Costs

SIC Code	Industry Description
20	Food and kindred products
21	Tobacco products
22	Textile mill products
23	Apparel and other textile products
24	Lumber and wood Products
25	Furniture and fixtures
26	Paper and allied products
27	Printing and publishing
28	Chemicals and allied products
29	Petroleum and coal products
30	Rubber and miscellaneous plastic products
31	Leather and leather products
32	Stone, clay and glass products
33	Primary metal industries
34	Fabricated metal products
35	Industrial machinery and equipment
36	Electronic and other electric equipment
37	Transportation equipment
38	Instruments and related products
39	Miscellaneous manufacturing industries

Appendix 6. Spending and Staffing by Federal Regulatory Agencies

Table A-8. Total Spending by Federal Regulatory Agencies on Regulatory Activity Fiscal Years (Millions of 2004 Dollars)

Fiscal Year	Social Regulations	Economic Regulations	Total
1990	16,022	3,690	19,712
1991	17,306	3,471	20,777
1992	18,791	3,754	22,544
1993	18,729	4,241	22,970
1994	18,984	3,933	22,918
1995	19,178	4,276	23,455
1996	18,771	4,065	22,836
1997	19,571	4,356	23,927
1998	21,052	4,360	25,412
1999	21,930	4,498	26,427
2000	22,475	4,676	27,151
2001	23,070	4,767	27,837
2002	27,272	5,127	32,399
2003	35,159	5,025	40,184
2004 *	31,770	5,325	37,095

Notes to Table A-8:

* indicates estimated value

Source: Dudley and Warren (2004), Table A-4, p. 23. Their figures were derived from the *Budget of the United States Government* and related documents, various fiscal years.

**Table A-9. Total Staffing of Federal Regulatory Activity,
Fiscal Years, Full-Time Equivalent Employment**

Fiscal Year	Social Regulations	Economic Regulations	Total
1990	119,699	33,941	153,640
1991	123,036	33,907	156,943
1992	128,590	35,890	164,480
1993	133,689	37,400	171,089
1994	131,424	36,937	168,361
1995	133,945	36,853	170,798
1996	134,225	34,142	168,367
1997	130,023	32,918	162,941
1998	136,867	33,062	169,929
1999	136,780	33,304	170,084
2000	140,060	33,135	173,195
2001	137,604	32,567	170,171
2002	149,656	33,003	182,659
2003	207,468	32,203	239,671
2004 *	206,103	33,521	239,624

Notes to Table A-9:

* indicates estimated value

Source: Dudley and Warren (2004), Table A-6, p. 25. Their figures were derived from the *Budget of the United States Government* and related documents, various fiscal years.

Appendix 7. Highlights from the Crain and Hopkins 2001 Study

Table A-10 reproduces the costs of regulations for 2000 that were presented in Crain and Hopkins (2001). These estimates for 2000 are converted into 2004 dollars to facilitate comparisons to the results in the current report (shown in Table 15 in the text).

Table A-10. Total Cost of Federal Regulations: By Type and Allocation Business Portion, 2000 (Original Estimates, Billions of 2004 Dollars)

	Total Costs (Billions of Dollars)	Business Portion		Others	
		Share (Percent)	Amount (Billions of Dollars)	Share (Percent)	Amount (Billions of Dollars)
All Federal Regulations	925	59	545	41	379
Economic	477	50	239	50	239
Workplace	90	100	90	0	0
Environmental	216	65	140	35	75
Tax Compliance	142	54	77	46	65

Source: Crain and Hopkins (2001).

As noted in the text and described in Appendix 1, this report introduces new procedures to estimate the costs of economic regulations. This procedure improves in several respects the reliability of that cost estimate relative to the procedure used in Crain and Hopkins (2001) to estimate the cost of economic regulations. In addition, the costs for workplace regulations were increased to reflect more comprehensive data about these costs (Johnson, 2005). These two methodological improvements are used to revise the results for 2000. The revised estimates for 2000 are revised to take into account these two changes as shown in Table A-11.

Table A-11. Total Cost of Federal Regulations: By Type and Business Portion, 2000* (Revised Estimates, Billions of 2004 Dollars)

	Total Costs (Billions of Dollars)	Business Portion		Others	
		Share (Percent)	Amount (Billions of Dollars)	Total Costs (Billions of Dollars)	Share (Percent)
All Federal Regulations	963	59	570	41	393
Economic	506	50	253	50	253
Workplace	100	100	100	0	-
Environmental	216	65	140	35	75
Tax Compliance	142	54	77	46	65

* **Source:** Crain and Hopkins (2001) and author's revisions.

These revised estimates increase the cost of all federal regulations by \$38 billion, a 4 percent increase over the original estimates for 2000. Specifically, the revisions increase the cost of economic regulations by \$28 billion (a 6 percent increase) and the cost of workplace regulations by \$10 billion (an 11 percent increase). The revised estimates increase the business portion of all regulations by \$24 billion, or 4 percent.

Table A-12 reproduces the Crain and Hopkins (2001) estimates on the costs per worker for all firms and broken down by firm size. Again, these estimates are converted into 2004 dollars to facilitate comparisons to the results in the current report (see Table 1 in the text).

Table A-12. The Incidence of Federal Regulations by Firm Size, All Business Sectors, 2000* (Original Estimates Restated in 2004 Dollars)

Type of Regulation	All Firms	Cost per employee for firms with:		
		<20 employees	20-499 employees	500+ employees
All Federal Regulations	5,180	7,651	4,738	4,896
Economic	2,265	1,772	1,808	2,726
Workplace	854	910	957	766
Environmental	1,331	3,651	1,287	787
Tax Compliance	730	1,318	685	617

Based on the revised estimates for the total cost of regulations in 2000 (Table A-11), Table A-13 presents the revisions to the costs per worker for all firms and by firm size.

Table A-13. The Incidence of Federal Regulations by Firm Size, All Business Sectors, 2000* (Revised Estimates Restated in 2004 Dollars)

Type of Regulation	All Firms	Cost per employee for firms with:		
		<20 employees	20-499 employees	500+ employees
All Federal Regulations	5,409	7,747	4,918	5,210
Economic	2,400	1,836	1,863	2,941
Workplace	949	943	1,082	866
Environmental	1,331	3,651	1,287	787
Tax Compliance	728	1,318	685	617

The revised estimates indicate that between 2000 and 2004 the cost per worker of all federal regulations increased by \$224, a 4.1 percent increase, after adjusting for inflation.