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# Grading Estimates of the Benefits and Costs of Federal Regulation

*A Review of Reviews*

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Winston Harrington

1616 P St. NW  
Washington, DC 20036  
202-328-5000 [www.rff.org](http://www.rff.org)



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## **Abstract**

I review two recent estimates of the costs and, in one case, benefits of federal regulation. The first is found in the Office of Management and Budget's 2005 report to Congress on the benefits and costs of federal regulations (OMB 2005b). OMB estimates annual benefits in 2004 to be \$70 to \$277 billion and costs to be \$34 to \$39 billion, but these estimates omit a great deal; the cost estimate, in particular, is generally acknowledged to be an underestimate. The other estimate, written by Mark Crain (Crain 2005) and sponsored by the Small Business Administration, uses a different approach and generates an estimate of \$1 trillion. Crain also finds that the burden on small firms is much greater than the burden on large firms. In the final section of the paper, I also review a recent comparison, presented in the 2005 report to Congress, of *ex ante* and *ex post* estimates of the benefits and costs of individual regulations. I find the Crain report to be deeply problematic and the OMB's *ex ante/ex post* comparison slightly less so.

**Key Words:** regulation, benefits, costs, *ex ante*, *ex post*, OMB

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# Grading Estimates of the Benefits and Costs of Federal Regulation: A Review of Reviews

Winston Harrington\*

## 1. Introduction

In the 1970s, a burst of congressional creativity produced legislation that vastly increased the ability of the federal government to impose *social regulation*—i.e., regulations of economic activity to promote a social goal, such as protection of the environment, promotion of workplace health and safety, prevention of unsafe consumer products from reaching the marketplace, etc. Ever since, there have been persistent and often heated controversies about the impact of those regulations on the economy. One prominent concern is simply that individual regulations may not produce benefits that exceed the compliance costs imposed on firms and individuals. Such regulatory failure could result from clumsy or inefficient regulatory designs that impose unnecessary costs or have unintended consequences. In addition, some skeptics of the value of social regulations appear to be worried about the aggregate effect of regulations on the performance of the overall economy, regardless of whether the benefits of regulations, taken as a whole, exceed the costs.

Efforts to address concerns about the economic impacts of individual regulations also began in the 1970s. The key event was Executive Order (EO) 12291, issued on February 17, 1981, shortly after President Reagan took office, announcing new rules governing the issuance of regulations by federal agencies. EO 12291 introduced two revolutionary innovations into federal rulemaking. First, it required federal agencies to produce, before any major proposed regulation could appear in the *Federal Register*, an assessment of the benefits and costs of the proposal and alternatives to it.<sup>1</sup> Before the Reagan administration, the (limited) economic assessment of regulations was concerned not with benefits and costs, but with economic impacts, which included the effect of the regulation on the inflation, employment, and the profits of affected

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\* Winston Harrington ([harringt@rff.org](mailto:harringt@rff.org)) is a senior fellow at Resources for the Future in Washington, DC.

<sup>1</sup> *Major regulations* are those with anticipated annual costs or benefits in excess of \$100 million or those that may cause major price increases, or that may have other particularly adverse economic consequences.

industries.<sup>2</sup> In addition, EO 12291 required centralized review of regulations and the accompanying regulatory impact assessment (RIA) by an oversight group, the Office of Information and Regulatory Affairs, housed in the OMB.<sup>3</sup>

The response to concerns about the aggregate effects of regulations is more recent. The *Regulatory Right-to-Know Act of 1999* (U.S. Congress, 106th Cong., 1st sess.) requires OMB to prepare an annual accounting statement, the *Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local and Tribal Entities* (hereinafter the Report to Congress). In addition to requiring the reporting of benefits and costs in total, by agency, and by major rule, the statute requires an assessment of the impacts of federal regulations on local and state governments, the private sector, small business, wages, and economic growth; the statute also requires recommendations for reform of ineffective or inefficient regulations.

Each year, the Report to Congress draws a fair amount of comment from close observers of regulatory matters. Besides five peer reviews requested by OMB, the 2005 report drew 15 comments, some running 100 pages or more, almost all from various interest groups with offices inside the Beltway.<sup>4</sup> No characterization of these groups would be completely accurate or fair, but several dichotomies are reasonably fair: right versus left; business interests versus social activists; and perhaps most neutrally, regulatory advocates versus skeptics. Thus, the organizations that consistently comment from one perspective include the National Association of Manufacturers, the U.S. Chamber of Commerce, and the Mercatus Institute at George Mason University, while those from the opposing perspective include OMB Watch, Public Citizen, and the Center for Progressive Reform.

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<sup>2</sup> See Magat et al. (1986) for a discussion of the preparation and use of such studies in the effluent guidelines rulemaking process.

<sup>3</sup> The regulatory review process is now governed by EO 12866, issued by President Clinton on September 30, 1993. The main changes to the Reagan procedure were to increase the public's accessibility to the process, to add requirements to examine distributional consequences of rules, and to require that the benefits of proposed regulations only have to "justify" the costs, not "outweigh" the costs, as had been the case in EO 12291.

<sup>4</sup> Compared to earlier years, this was a very small number of comments. The 2003 draft Report to Congress, for example, drew 367 comments, a great many of them from private citizens. That was the year that OMB mooted the notorious senior discount, a proposal for a special (and smaller) value of statistical life for senior citizens. The citizen comments tended to be shorter (typically a page or less) and more emotional (the emotion usually was outrage) than the comments from the representatives of lobbying groups.

The method used by OMB to comply with these requirements is simply to aggregate, in the various ways required by the statute, the benefit and cost estimates found in the RIAs accompanying the regulations actually issued each year. The regulations that contribute to the aggregate estimates, however, are limited to those with RIAs, which are prepared for only a small fraction of all regulations. In addition, only regulations enacted in the past 10 years are included in the estimate. Thus circumscribed, OMB's 2005 estimate of the annual benefits of regulation was \$70 to \$277 billion, and of the annual costs, \$34 to \$39 billion.

The skeptics regard the cost number as a vast underestimate, which is not surprising, perhaps, considering how it is constructed. (They leave it to others to observe that, by the same token, the benefit number must also be too low.) However, their argument goes beyond the observation that many regulations are left out. They are also concerned that regulation in toto generates important and adverse economic impacts, quite apart from the direct compliance costs estimated in RIAs. They point to studies of the aggregate costs of regulation that produce estimates of much greater aggregate regulatory costs. In particular, the skeptics are apt to cite the estimates of regulatory costs produced by Crain and Hopkins (Hopkins 1995; Crain and Hopkins 2001; Crain 2005), the latest of which is a formidable \$1.1 trillion annually. This estimate—which includes all regulations, and not just social regulation—exceeds OMB's estimate by well over an order of magnitude.

For their part, the advocates of regulation prefer to consider studies of individual regulations and seem to have no problem with OMB's method of producing aggregate estimates by adding up the costs and benefits of individual regulations. However, they do question the methods and results of the individual RIAs, arguing that the regulations grossly underestimate the benefits of regulations and overestimate the costs. In their view, social regulations hardly impose any cost at all on the economy, while the significant underestimation of benefits largely results from entire classes of benefits that cannot be monetized and are therefore left out of formal benefit calculations.

In the 2005 Report to Congress OMB (2005b), OMB specifically addresses the question of how accurate the cost estimates of individual regulations are. A chapter of the report is given over to validation, and consists of comparisons of the *ex ante* benefit and cost estimates in the RIAs of selected regulations with the actual or *ex post* cost estimates, which are estimates made after the regulation has been implemented. OMB concludes that, yes, the costs of regulations are overestimated, but the benefits of regulation are overestimated even more.

Thus, the 2005 Report to Congress lays bare the very large differences between OMB and its critics. There is, to begin with, a vast difference in estimates of the aggregate cost of regulation between OMB and regulatory skeptics. In addition, there is a difference—perhaps not quite as large—between OMB and regulatory advocates on the biases in regulatory cost estimation. The purpose of this paper is to examine in more detail these two discrepancies. In Section 2, I compare and critique OMB’s bottom-up approach to estimating aggregate benefits and costs with the more eclectic approach taken by Crain and Hopkins on behalf of the Small Business Administration (SBA). While OMB’s approach has some unavoidable problems, I conclude that there is very little basis for the startling estimates produced by Crain and Hopkins. Section 3 takes on the validation chapter in the 2005 Report to Congress; in effect, it can be regarded as a peer review that the chapter should have received, but didn’t, during the peer review of the entire document. The main finding is that OMB’s conclusions are driven largely by the sample of regulations used to make the tally. Choose a different sample, and a different outcome emerges. Section 4 presents some conclusions.

## 2. Aggregate Estimates of Regulatory Benefits and Costs

Just to be clear below, by *bottom-up estimates of aggregate benefits and costs*, I mean the summing up of the cost estimates of individual regulations. An alternative *top-down approach to estimating costs* uses macroeconomic models in an attempt to link changes in outcomes such as GDP or productivity with a variable or variables that indicate the extent of regulatory intrusion in the economy. This latter approach hasn’t been tried for benefits.

### 2.1. OMB’s Bottom-up Estimates

Despite the congressional mandate, the OMB report does not attempt to estimate the total benefits and costs of all federal regulations, probably because a comprehensive estimate would be too difficult to achieve. Instead, OMB focuses on the regulations for which benefits and costs have already been estimated, the regulations that are reviewed by OMB pursuant to EO 12866.<sup>5</sup> Furthermore, OMB has established a convention of including only the most recent 10 (fiscal) years of regulations, even though regulations issued more than 10 years ago are still active and

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<sup>5</sup> Issued by President Clinton, this Executive Order superseded President Reagan’s EO 12291 but retained the latter’s requirement that each major proposed rule had to be accompanied by an RIA that, among other things, estimated the anticipated benefits and costs of the rule.



continue to constrain economic activity. Thus, this report presents the annual benefits and costs of 88 major rules implemented during the 10-year period fiscal 1995–2004. In 2000 dollars, the sum of benefits is estimated to be \$70 to \$277 billion per year, against estimated costs of \$35 to \$39 billion.

The Report to Congress is not very informative on the quantitative relationship between the summed annual estimates of annual costs and benefits, and the “true” aggregate annual benefits and costs of regulations. The authors freely acknowledge that the estimates in the Report are incomplete, because they encompass only a tiny fraction of the totality of federal regulations implemented each year. But how incomplete? On the one hand, OMB claims that the few regulations included in the estimate “capture the vast majority of total costs and benefits of all rules subject to OMB review” (OMB 2005b, p. 11). On the other hand, OMB also admits that the cost and benefits of all federal rules, and not just those subject to OMB review, “may be significantly larger than the sum of the costs and benefits reported” in the paragraph above (OMB 2005b, p. 9). Indeed, even this statement is a bit weaker than the version in the draft report, which suggested that total costs and benefits “could easily be a factor of 10 or more larger than the sum of the costs and benefits” reported (OMB 2005a, p. 9).

The logic behind these assertions is that there are pieces missing from the aggregate estimates, so the aggregates must be underestimates. That logic could, of course, be overturned by a finding that the estimates of benefits and costs of individual regulations are systematically overestimated. Leaving that possibility aside momentarily, it appears that the main sources of missing pieces are the following:

- regulations not included in the estimates;
- the “10-year rule;” and
- categories of costs that are excluded.

#### *Regulations Not Included in the Estimates*

Each year, only a handful of the thousands of federal rules promulgated annually make it into the annual estimate. Over the past decade, the average was 8.8 rules per (fiscal) year; in fiscal 2004, 11 rules qualified. The sum of estimated annual costs for these 11 rules is \$3.8 to \$4.0 billion. Estimated annual benefits range from \$13 to \$108 billion, with the high estimate attributable to two fine particulate (PM) rules with extraordinarily high expected benefits.

There is a brief discussion of the reasons for exclusion and the number of rules in each excluded category in the appendix to this paper. The main reason for exclusion is jurisdiction: The vast majority of federal rules are administrative decisions affecting single firms or individuals and are not reviewed by OMB. A few other rules escape OMB review because they were issued by “independent” federal agencies, such as the Securities and Exchange Commission, that have been granted a statutory exemption from OMB regulatory review.<sup>6</sup> For major rules by independent agencies, the Government Accountability Office (GAO) is required to submit reports; it identified four such rules in fiscal 2004. However, none of these rules seemed to have substantial costs.

In addition, nearly 90 percent of the rules that are reviewed by OMB do not enter the benefit and cost estimate because they are nonmajor rules, which means primarily that each has an estimated cost and benefit that is less than \$100 million per year. It is still possible that the large number of such rules could make their cumulative effect comparable to that of the major rules. However, in last year’s report (OMB 2004), OMB examined the nonmajor rules for a set of agencies—the Occupational Safety and Health Administration (OSHA), the Food and Drug Administration (FDA), and the National Highway Traffic Safety Administration (NHTSA)—with a good track record for quantifying both benefits and costs of nonmajor rules. The ratio of the aggregate costs of nonmajor to major rules in these agencies ranged from 5 to 13 percent. While the FDA and NHTSA sample consisted only of rules promulgated in fiscal 2003, the OSHA sample included all regulations back to 1976. Although this evidence is not conclusive, it is fairly persuasive.

Furthermore, while numerous critics have complained about the cumulative impact, none has yet cited good evidence it is significant. In some cases, critics have complained that agencies have acted strategically in designating certain rules with major impacts as nonmajor rules. For example, at least one commenter on the draft 2005 Report to Congress (OMB 2005a) accused the Environmental Protection Agency (EPA) of failing to designate the total maximum daily load (TMDL) rule as a major rule even though it has the potential of imposing billions in annual costs on industrial dischargers, sanitation districts, and local governments. So far, however, there is no final TMDL rule, although there may be some anticipatory planning activity at the state and local level, and OMB does not include regulations in the accounting report until after promulgation.

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<sup>6</sup> Other independent federal agencies, such as the Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA), do not have such exemptions.

Of the remaining 45 major rules, 19 are removed from further consideration because they are so-called transfer programs. This terminology and other language in the 2005 draft Report to Congress (OMB 2005a) left some readers with the impression that OMB regarded these programs as cost and benefit free, which they obviously are not. OMB added this interesting paragraph to the 2005 final Report to Congress (OMB 2005b, p. 17):

Please note that rules that transfer Federal dollars often have opportunity costs or benefits in addition to the budgetary dollars spent. Including budget programs in the overall totals would, however, overwhelm the incremental new regulatory impacts identified by this Report and would confuse the distinction between rules that impose costs primarily through the imposition of taxes, and rules that impose costs primarily through mandates on the private sector. We also caution the reader not to assume that these rules were subject to less stringent analytical and review requirements based on our less-detailed presentation of Federal budget rules in this Report. In fact, agencies thoroughly analyze and OMB thoroughly reviews all significant Federal budget rules under E.O. 12866. If economically significant, these rules must be accompanied by regulatory impact analyses that comply with OMB Circular A-4.

OMB's rationale for keeping budgetary and regulatory programs separate is sensible, but if it is true that budgetary programs would overwhelm regulatory programs, perhaps there should also be an annual budgetary accounting statement that provides estimates of the opportunity costs and benefits of major programs (and not simply the level of transfers). According to the statement above, RIAs for such spending programs must be prepared; why not gather the outcomes in one place just as the annual Reports to Congress does for regulatory programs? As far as I know, no such report exists.

The remaining 26 rules are in the 2005 Report to Congress (11 rules), or they are missing benefits (12), costs (2), or both (1). Among those missing benefits are seven antiterrorism regulations implemented by the Departments of Homeland Security (DHS), and Health and Human Services (HHS). The cost estimates for fiscal 2004 are \$1.8 to \$3.6 billion per year. The remaining five regulations with missing benefits have estimated annual costs of about \$2 billion, and the two regulations without costs have estimated annual benefits of about \$0.9 billion. Counting the missing regulations—the nonmajor regulations subject to OMB review, the major regulations exempt from the RIA requirement, and the DHS and other regulations that are missing costs or benefits—will approximately double the annual cost (\$3.8–4.0 billion) of

regulations enacted in 2004. It is impossible to say what the effect on benefits would be, since so few of the regulations in question have benefits. It is extremely unlikely that benefits will double, considering that the existing estimate includes those two unusually beneficial fine PM regulations.

### *The 10-Year Rule*

OMB applies a 10-year rule when estimating the cost of a regulation. That is, after a rule is promulgated, its estimated annual costs appear in the Report to Congress for only 10 years. Thus, the 2005 Report to Congress omits the estimated annual costs associated with regulations that were issued prior to fiscal 1995. There is no reason to think that this practice systematically biases the ratio of benefits and costs, since after 10 years both benefits and costs are dropped. It should be noted, nonetheless, that in any particular year, the dropped benefits could be much greater than the dropped costs, or much less. In 2004, for instance, the 10-year rule reduced benefits far more than it reduced costs, because one of the rules dropped from the 2005 estimate is the acid rain trading program, yet another fine PM regulation with very large benefits.<sup>7</sup>

OMB drops regulations from the accounts after 10 years because “[it does] not believe that the pre-regulation estimates of the costs and benefits of rules issued over 10 years ago are very reliable or useful for informing current policy decisions” (OMB 2005b, p. 20). This statement implies that if only the authorities had more recent estimates of the cost of rules—estimates based on actual experience—there would be no need for a 10-year rule.

However, there is another reason for questioning the benefits and costs of old rules, one that goes back to first principles. By definition, estimating the cost of a regulation requires a comparison of the cost implications of a world with the regulation, to the cost implications of a world without it. Only one of these outcomes can be observed, which means that the cost of a regulation (or of not having a regulation) is hypothetical, and it is hypothetical whether the cost is estimated *ex ante* or *ex post*. If the regulation only requires small changes in behavior over a small time interval, then analysts feel confident of estimating the cost, hypothetical or not. But as the size or time interval increases, the shadow of the hypothetical looms ever larger. To take an extreme example, how would one begin to estimate the cost of federal child labor laws that were enacted during the 1930s?

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<sup>7</sup> Table C-1 in the 2005 Report to Congress (OMB 2005b) includes a list of the regulations that were dropped from the report because they had been enacted in fiscal 1994.

Perhaps a better way to think about the cost of a well-established rule promulgated long ago is to consider the effects of deregulation, of removing the rule, especially if the objective is to determine its current rather than its historical burden. The estimate of the costs of existing economic regulation by Hahn and Hird (1991) used this approach, relying on studies that estimated the gains to the economy from deregulation of airlines, trucking, communications, etc. None of the original studies cited by Hahn and Hird went back to the origin of such an economic regulation and attempted to estimate its costs, *ex ante* or *ex post*, each year since the inception of the regulation. If we apply this approach to the example of federal child labor laws, the analysis becomes feasible and no different in principle from the analyses that economists carry out routinely.

To summarize, old rules might be economically significant, and the 10-year cutoff for counting costs or benefits might be arbitrary, but it is clear that some cutoff is justified. Considering that the main rationale for the reporting aggregates is to determine the total economic burden, more attention should be given—at OMB and elsewhere—to better ways of estimating the current effect of the older rules on today's economy. In this respect, determining the cost savings of eliminating those rules is far better than simply removing the 10-year rule. No attempt has been made to do that for social regulations, so while a more theoretically correct estimate of the cost of regulation that included older regulations would probably increase the costs (and benefit) estimates, it is impossible to say by how much.

#### *Excluded Cost Categories*

Cost estimates generated in RIAs tend to be focused primarily on compliance expenditures. Potentially important categories of benefits and costs are often not included in the agency estimates, even for the 11 regulations generating the benefits and costs in OMB's accounting report. Some of these categories follow:

- firm-specific costs in excess of direct compliance costs, including employee training and efforts to ascertain what the rules require, claims on management attention, discouraged investment, lost producer and consumer surplus from reduced output, and retarded innovation;
- tax interaction effects: an increase or decrease in losses associated with distorting taxes; and

- costs of *rent seeking*, the unproductive activities undertaken by firms and individuals that influence regulatory decisions in their favor or to increase their return from existing regulations.

Similarly, there are numerous categories of benefits that are difficult or impossible to measure and that thus are often left out of benefit estimates. Measurable benefits tend to be concentrated types of public goods where the connections from the regulation to a physical effect that people value are clear, and where economists have been able to develop valuation methods that approximate individual willingness to pay for changes in those effects. An example of where benefit estimation fails on both grounds is protection of wetlands, which may produce desirable ecological effects and also may prevent flood damage. Unfortunately, the effects of human activities on natural systems are not understood well enough to predict how such a system would behave with and without a given regulation. Even if the system was understood well enough to predict effects on biological communities or the frequency and severity of floods, no generally accepted methods have been developed for estimating the value of such ecosystem effects (although estimation of flood control benefits might be possible).

Benefit and cost categories are excluded largely because they are difficult to measure, and for that reason, it is difficult to modify the existing estimates to take them into account. As discussed below, however, they can be estimated indirectly, in simulations of the entire economy using computable general equilibrium (CGE) models. Two such estimates suggest that the total cost of regulations exceed the direct compliance cost by 35 to 50 percent.

#### *The Bottom Line on Bottom-up Estimates*

These exceptions illustrate what is said to be the principal weakness of bottom-up methods: They have a tendency to leave out some components of regulatory costs. Taking into account the missing pieces discussed above, it appears that the estimated costs of all regulations issued in 2004 might exceed the estimated cost of the 11 regulations included in the 2005 Report to Congress by a factor of three, although of course not much confidence can be put in this number. For benefits, it is impossible to make even a rough judgment. As discussed in Section 3 of this paper, however, research suggests that both regulatory-agency costs and benefits are overestimated more often than they are underestimated.

Moreover, there is some doubt whether the actual reported expenditures on compliance are truly underestimates of the costs of regulation. Morgenstern et al. (2001) linked firm-specific data on annual expenditures on pollution abatement from the Pollution Abatement Costs and Expenditures (PACE) Survey to the Longitudinal Research Database of the Census of

Manufacturing; and from the Manufacturing Energy Consumption Survey of the Department of Energy, in order to investigate how abatement expenditures affect total manufacturing costs. If compliance costs are accurate estimates of regulatory costs, then each additional dollar of the former ought to increase the latter by a dollar.

Morgenstern et al. (1997) find that reported abatement costs do not seriously underestimate regulatory cost. If anything, they are a slight overestimate of costs: The 95 percent confidence interval ranges from a 14 percent underestimate of total costs to a 68 percent overestimate. At least three possible reasons could be given for this finding. First, it could be that respondents to the PACE Survey simply overestimate regulatory costs. Second, abatement costs could be joint with other costs. Installing abatement equipment might require a plant shutdown, for example, during which a plant manager would take pains to do plant maintenance or equipment upgrades for other reasons. Joint costs could also arise if the same equipment train could deal with the different pollutants or increase productivity as well as reduce pollutant discharges. A third possible reason is the so-called *Porter effect*, which is when the requirement to comply engenders a fresh look at manufacturing processes, raw materials, etc.; that fresh look can then lead to cost-saving innovations. (However, it should be noted that the Morgenstern et al. (1997) result does not support the *strong form* of the Porter hypothesis, i.e., that sensible environmental regulation actually reduces production costs.)

In addition, let us note two advantages of bottom-up methods. First, the accuracy of the cost and benefit estimates, and hence the validity of the models used to generate them, can usually be checked by comparing those estimates against the actual performance of the individual regulations. Second, and more important, the comparison of benefits and costs focuses attention on the quality of those rules and the likelihood that they will improve welfare. Such periodic comparisons are essential to find regulations that are candidates for modification, elimination, or expansion.

## **2.2. Top-down Estimates**

Probably the earliest examples of top-down estimates of regulatory costs were produced by Denison (1979), who used growth accounting to decompose U.S. productivity growth into a number of factors, including changes in capital stock, natural-resource endowments, labor supply, innovative activity, etc., in order to explain the decline in productivity growth that began in the 1970s. According to Denison's results, new regulations from OSHA and EPA were an

important part of that decline. Christainsen and Haveman (1981) also use various regulatory intensity variables to estimate effects of regulation on productivity, with similar findings.

Pure top-down estimates of regulatory costs are rare. More common are hybrid studies, which embed sector-specific compliance cost estimates as factor inputs in a more comprehensive model, in particular a multisectoral CGE model of the U.S. economy. Such studies by Hazilla and Kopp (1990) and Jorgensen and Wilcoxon (1990) find that the economywide costs of environmental regulation are 30 to 50 percent greater than the direct compliance cost. Other studies are more eclectic. Hahn and Hird (1991), for example, combine *ex post* sectoral studies of economic regulation with a variety of *ex ante* approaches for social regulation (most notably the use of Hazilla and Kopp's (1990) estimates of the general equilibrium costs of environmental regulation). Even more eclectic is the work of Thomas Hopkins and Marc Crain, which has used a very aggregated, top-down approach to estimate costs of economic regulation and filled in perceived gaps in coverage over time and sector with sectoral studies and even OMB estimates of the costs of particular regulations. I will consider the Hopkins-Crain work in more detail in Section 2.3.

The strengths and weaknesses of top-down studies mirror those of bottom-up studies. Because top-down methods associate indicators of regulatory activity with changes in macroeconomic variables, they risk attributing to regulation the effects of other variables that are not considered in the analysis but that may be correlated with regulatory activity. There is a strong chance of omitted variable bias, in other words. Often, furthermore, the effects attributable to regulation are residual, i.e., the researcher cannot attribute them to other factors. This is the strategy used in the early work by Denison (1979), for example. Inasmuch as these methods focus only on the costs and not the benefits of regulation, they are especially prone to antiregulatory bias.

In addition, what were noted above as strengths of bottom-up methods are weaknesses of top-down methods. Thus, it is difficult or impossible to subject them to empirical validation. For example, while the CGE models mentioned above may be constructed (at least in part) using parameters that have been estimated from real-world data, the model itself cannot be validated against real-world outcomes. They are also practically useless for determining the value or performance of individual regulations.

Nonetheless, numerous observers, especially if they happen to be regulatory skeptics, prefer top-down estimates, on the grounds that their greater comprehensiveness is likely to provide a better sense of regulatory burden. However, that may not be totally accurate. In the



first place, an approach that focuses only on aggregate cost with no regard for aggregate benefit is of limited value. More to the point, what may be just as important as the level of the burden is the trend over time, and to evaluate trends a bottom-up estimate may be just as useful as a top-down estimate. It may leave things out; if it leaves them out consistently, then one can still compare the growth rates in estimated regulatory cost to growth rates in GDP, say, to determine whether regulation is growing faster than the economy.

For example, the estimated annual cost of rules added to OMB's aggregate estimate in fiscal 2004 was \$3.8 to \$4.1 billion (OMB 2005b, Table 1-3). Aggregate cost of rules added 10 years earlier was \$4.2 to \$4.6 billion, and the year before that, \$3 to \$4 billion (all estimates in 2001 dollars). If we can judge from the annual compliance costs, there is no apparent trend toward greater regulatory burden over this 10-year period. This is not surprising, because it has been awhile since the last major legislation that generates social regulations was enacted.

### **2.3. Estimates by Crain and Hopkins**

As noted above, a recent study of the cost of regulations by Crain (2005) estimates annual regulatory costs to be \$1.1 trillion. This study is the third in a series of reports, sponsored by the SBA, that attempt to estimate the total burden of federal regulation on the U.S. economy. What is new in Crain (2005) is a top-down analysis of economic regulation using data from the Organisation for Economic Co-operation and Development (OECD). Apparently, the other important findings and many of the estimates are recapitulated and updated from the previous two reports (Hopkins 1995, Crain and Hopkins 2001). I'll use "Crain" when specifically referring to the Crain (2005) report, especially the analysis of economic regulation therein; otherwise, I'll refer to the authors as "CH."

To compute the total costs of regulation, CH divide regulations into four categories—economic, tax compliance, workplace, and environmental—and employ a variety of methods to estimate the costs in each category. CH make two important claims about the economic effects of federal regulation. First, they argue that OMB vastly underestimates regulatory costs. In the latest report, Crain (2005) estimates the annual cost of federal regulations in 2004 to be \$1.1 trillion, or 11 percent of GDP, compared to the OMB estimate of \$34 to \$39 billion (both estimates in 2001 dollars). Second, they find powerful economies of scale in regulatory compliance costs, such that the total regulatory cost per employee of small firms (0–19 employees) is 45 percent greater than that of large firms (500 or more employees). Environmental compliance costs are especially burdensome for small firms; their compliance

costs are more than three times those of middle-size firms and more than 4.5 times those of large firms on a per-employee basis.

It turns out, however, that each of these claims rests on weak methodological and empirical foundations. None of this work has appeared in peer-reviewed journals. This work is not often cited in the academic economics literature, even by academic skeptics of regulation such as those found at the American Enterprise Institute and Brookings Institution (AEI-Brookings) Joint Center for Regulatory Studies. However, the findings of CH are reported as fact, with no mention of its significant methodological problems, on the Web sites of antiregulatory think tanks such as the Heritage Foundation and Cato Institute. The results are prominently featured on the SBA Web site and have been taken up by conservative congressmen and antiregulatory interests. Also, in the section of the 2005 Report to Congress on small business effects of regulation, OMB seems to lend credence to the methods and results of CH, (OMB 2005b, p. 26) and in testimony before Congress, former Office of Information and Regulatory Affairs Director John Graham called their estimates the “best available for their purpose,” while going on to cite some serious data deficiencies in the work.<sup>8</sup> Given the support and attention that this work has received, it deserves closer scrutiny. I will focus on three of the most critical methodological issues:

- the method used in Crain (2005) to estimate the total costs of economic regulation;
- the treatment of transfer payments, transfer costs, and indirect costs; and
- the method used to estimate environmental compliance costs by firm size.

### *The Cost of Economic Regulation*

To estimate the cost of economic regulations, Crain (2005) constructs a data set of observations on 24 OECD countries. The variables include an index of economic regulation developed by the OECD (developed by Nicoletti et al. 2000); per capita GDP and GDP growth; and a set of control variables (indices of foreign trade, elementary school enrollment, 1998 GDP per capita, and ethnolinguistic diversity). He then estimates statistical models to explain average per capita GDP (1998–2002) and GDP growth as a function of the regulation index and the other

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<sup>8</sup> House Committee on Government Reform, Hearing on H.R. 2432, *Paperwork and Regulatory Improvements Act of 2003*, July 22, 2003. Cited in OMB Watch 2005, p. 11.

variables.<sup>9</sup> The regression estimates indicate that a one-unit change in the OECD regulatory index reduces GDP per capita by \$1,343 and the GDP growth rate by 0.9 percent. The current U.S. index is 1, “which implies that a change from 1 to 0 (eliminating domestic economic regulatory restrictions completely) would increase U.S. GDP per capita by \$1,343” (Crain 2005, p. 20).

This approach is riddled with problems. First, with six parameters to estimate, the model contains only 18 degrees of freedom. With so few degrees of freedom, no analysis can be anything more than merely suggestive. Second, the model is a reduced-form model, with no theory to guide the selection of the control variables. Without an obvious justification for the choice of variables in the model, one naturally suspects the model is the result of a specification search, a process of sifting through control variable candidates to find the best model. Virtually everyone who does empirical work in statistics engages in specification searches (or data mining) to some degree, but careful researchers are wary of doing so. It is probably the principal way that statistical analysis can be abused to arrive at a predetermined conclusion. Even when intentions are honest and the researcher has no particular agenda, use of a specification search can invalidate the usual interpretation of t-statistics and other measures of statistical significance. Since a researcher is in effect allowing himself several trials, it is not valid to use a statistical test predicated on a single trial unless the results are *robust*, meaning that the coefficient on the variables of interest are not unduly affected by the choice of control variables. In the present case, the coefficient on the OECD regulation index is barely significant. Thus, the author needs to say whether he tested other specifications, and if so how the OECD index performed.

Third, even ignoring the problems above, this model very likely suffers fatally from omitted variable bias. Any variable that affects GDP per capita and that happens to be correlated with the OECD index would have its effect loaded onto the OECD index coefficient. For example, if countries with high economic regulatory indices also tend to have high levels of other kinds of regulation, then the coefficient would reflect the effects not only of economic regulations, but also of the other correlated regulations. Another potential omitted variable is the level of taxes in the economy. Again, if high taxes are positively correlated with intrusive economic regulation, the regulation coefficient would once again exaggerate the effects of regulation.

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<sup>9</sup> In their 2001 work, CH rely on an OECD study of U.S. telecommunications and energy regulation (which estimated the economic cost of these regulations to be \$101 billion per year (OECD 1999) and an OMB (2000) estimate of the economic cost of trade barriers (\$44 billion per year).

*Transfer Costs*

When estimating the costs of public programs or projects, economists are careful to distinguish between true resource costs and transfer payments, such as taxes, subsidies, and monopoly.<sup>10</sup> Transfer payments are simply redistributions of resources from one party to another. It's important to note that all public programs have both resource costs and transfer payments associated. In some—public investment projects or direct regulations, for example—resource costs may dominate, but there will still be distributional effects, and hence winners and losers. Conversely, other programs may be intended primarily to redistribute resources, but these programs are bound also to affect the incentives to produce and consume among the parties affected, thus generating real resource implications. Of course, when it comes to estimate these costs empirically, it is much easier to estimate resource costs in a regulatory or public investment program than it is to estimate transfers, because the project or program is articulated in terms that lend themselves to resource cost estimation. Similarly, when evaluating a transfer program, it is generally easier to estimate the transfer payments than it is to estimate the resource costs that accompany them. For example, consider a regulation to reduce particulate discharges from a utility boiler. The regulation will describe the type of boilers affected, the magnitude of reduction required, or other conditions for compliance. Translating these requirements into resource costs is relatively straightforward, much more so than figuring out whether any firms in the affected industry or competing industries will gain a competitive advantage or whether or by how much consumers will have to pay higher electricity prices.

In addition, Tullock (1967) observes that, when considered in a larger political context, the transfer payments inherent in all government programs impose yet another cost, because both potential gainers and losers from public programs will expend resources in rent-seeking behavior, including lobbying activities to affect public decisions on the magnitude, timing and duration of a regulatory program.

These considerations make the estimation of the costs of a regulation much more difficult, for now one must determine (i) the magnitude of the transfers that accompany the regulation and (ii) the cost of the associated rent seeking. For transfers, CH rely on a survey of analyses of the costs of economic regulations (Hahn and Hird 1991). For some of the policies surveyed by Hahn and Hird, both economic costs and transfer payments were estimated, and in

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<sup>10</sup> Monopoly imposes both a cost, in the form of reduced output, and a transfer payment, because resources are transferred from consumers to the monopolist.

those cases the minimum ratio of the two turned out to be 1:2. CH use this ratio to estimate the transfer payments associated with a few categories of economic regulation that evidently were excluded from the OECD index of economic regulation, in particular agricultural regulations and health-care regulations. They take OMB's estimates of the costs of these regulations and multiply by two to obtain transfer payments.

When converting transfers to transfer costs, CH take the simplest approach possible: They assume transfer costs exactly equal transfers. "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" (Crain and Hopkins 2001, p. 12. The same sentence appears in Crain 2005, p. 10.). Apparently, this notion came from Posner (1975), who shows in a model of monopoly competition that rent-seeking will exhaust all the rents. Posner makes two important assumptions to reach this conclusion. First, obtaining and defending a monopoly is a competitive activity, and therefore an existing monopolist and its opponents would continue to expend resources to obtain monopoly rents as long as the marginal rents obtained exceed the marginal costs. The second and more critical assumption is constant returns to scale in inputs to obtain rents. If both these assumptions are satisfied, then the monopoly rents will be fully dissipated, i.e., transfer costs will equal transfer payments.

There are at least two reasons to think these assumptions are questionable, especially when applied in a setting that does not involve a monopoly. First, regulatory rent seeking is at least as likely to be characterized by decreasing returns to scale as it is to be characterized by constant or increasing returns to scale. Prior to the implementation of a regulation, the principal form of rent seeking will be lobbying by the industries to be regulated, competing industries, and public interest groups. Lobbyists can make their concerns known as often and as extensively as they like, but it seems likely that their impacts on regulators decreases with successive appeals.<sup>11</sup>

Another reason for doubting the efficacy of rent seeking in regulatory matters is the public-good nature of many interventions by regulated parties. When a firm invests lobbying resources to influence regulation or legislation, the benefits will be shared by other firms in the

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<sup>11</sup> Comments and claims by regulated parties and others may have little effect on the rulemaking process anyway. In a study of EPA rulemaking, Magat et al. (1986) find that external comments have little effect on the stringency of the final rules. Far more important are the effects matters that are internal to the process, in particular the quality of the analysis produced by EPA to support the regulation.

same position, weakening the incentive to invest in this way.<sup>12</sup> This is why trade associations figure so prominently in comments on federal regulations: They produce public goods for their members. Often, however, differences among member firms put limits on what trade associations can advocate.

In short, there are good reasons for doubting that total transfers are exhausted by rent-seeking behavior. In order to make their case, CH need to provide empirical evidence for both propositions, and neither they nor anyone else has done this.

#### *Economies of Scale in Regulatory Compliance*

This is one of the most important claims in this body of work, and is of course the reason it is of so much interest to the SBA. Virtually the identical work was present in Crain and Hopkins (2001). It turns out that the claim of economies of scale in regulation can be entirely accounted for by environmental regulation, as shown in Table 1. It is true that modest economies of scale are also reported for tax compliance regulations, but, as shown, these are more than offset by small diseconomies of scale in workplace and economic regulations.

**Table 1. Annual Costs of Regulation as Reported by Crain (2005)**

	All regulations (dollars per employee)	All but environmental regulations (dollars per employee)
Small firms (<20 employees)	7,647	4,451
Medium-sized firms (20-499 employees)	5,411	4,463
Large firms ( $\geq$ 500 employees)	5,282	4,502

*Source:* Crain 2005.

The main driver of these results is the environmental regulations. Certainly, the existence of economies of scale in environmental regulation is a reasonable hypothesis. Larger firms tend to have larger plants and a greater number of plants than small firms. Large plants tend to have lower unit abatement costs than small plants in a given industry because of economies of scale. The greater number of plants can also lead to economies, such as an improved bargaining position in purchasing decisions or more opportunities for cost-reducing specialization or standardization. However, the greater vulnerability of small firms is often recognized in

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<sup>12</sup> Magat et al. (1986) also find that many commenting firms respond to the free-rider problem by seeking not to relax the rule, but to create new rules that would be tailored more to their situation. These subcategorization attempts are often successful.

regulations that do not hold them to the same environmental standards to which they hold large firms. The net effect of scale on abatement cost is therefore unclear.

CH's conclusion that compliance with environmental regulation displays scale economies comes from a simple statistical model, estimated using state-level data from the 1992 Economic Census on pollution abatement expenditures, number of employees, value of shipments, and firm size (See Crain 2005, Appendix 5, or Crain and Hopkins 2001, Appendix 2, for a discussion of the data and model.) The model estimated by CH is as follows:

$$\ln(\text{PAC/employee})_{is} = \beta \ln(\text{firm size})_{is} + \phi \ln(\text{value of sales})_{is} + \gamma_i + \varepsilon_{is}$$

-0.431	0.698
(0.243)	(0.183),

where  $\ln$  stands for the natural logarithm, PAC/employee is average pollution abatement expenditures per employee in industry  $i$  and state  $s$ , firm size is the average firm size (measured by number of employees) in industry  $i$  and state  $s$ ,  $\gamma_i$  an industry dummy variable, and  $\varepsilon_{is}$  the error term.<sup>13</sup> In a model such as this, where the independent variables and dependent variable are transformed by logarithms, the coefficients on the independent variables can be interpreted as elasticities. These coefficients and their standard errors are shown below the equation

What CH do next, apparently, is to extract the coefficient on firm size from this model as an elasticity and use it to estimate the abatement per-employee cost of environmental regulation. They apply this elasticity, together with the information on distribution of firms by size, to allocate the total cost of environmental regulation. However, they ignore the other variable in their model, the value of sales, which is itself a scale indicator. Note that the coefficient on this variable is positive, i.e., abatement costs per employee *increase* as firms' value of shipments increases. Of course, there is a strong positive correlation within an industry between the number of employees at a plant and the value of shipments. In any statistical model, you cannot cherry-pick the coefficients you like and ignore the ones you don't. But that is what the authors have done. Because the authors ignore the value-of-shipments coefficient, their claim of economies of scale in pollution abatement expenditures is utterly without foundation. If the model says anything at all, it is that holding value of shipments constant, abatement costs decline as number of employees increases. In other words, abatement costs decline as labor *intensity* increases.

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<sup>13</sup> Although CH indicate that the data are for firms, the data are collected for plants. Firms often have many plants, possibly in several states, so if this really is firm-level data it's not clear what they have done with it.

However, even that conclusion is questionable because of (I suspect) the high collinearity between the number of employees and value of shipments. Also, once again the econometric model is very *ad hoc*, with no basis in economic theory.

### 3. The OMB Validation Study

As noted above, about the most that can be said is that OMB's aggregate benefit and cost numbers appear to be underestimates, and even that conclusion could be overturned by a finding that the estimated benefits and costs of individual regulations are overestimates. One purpose of validation studies is to investigate this issue.

#### 3.1. A Brief History and Description

*Ex post* analysis of the costs (and other consequences) of government regulations is surprisingly uncommon, especially in comparison to the large number of *ex ante* studies. An early *ex post* comparison carried out by EPA consultants compared estimates of capital expenditures by sector with PACE Survey data (Putnam, Hayes & Bartlett, Inc. 1980), finding overestimates more prevalent than underestimates. However, the estimates looked at sectoral expenditures, not at the costs of particular regulations. As part of a study of regulatory procedures at OSHA, the Office of Technology Assessment (OTA) produced *ex post* analyses for about 15 OSHA rules (OTA 1995). A later study of EPA and OSHA regulations by Goodstein (1997) concluded that overestimation of costs is the rule.

Several years ago, Richard D. Morgenstern, Peter Nelson, and I surveyed the peer-reviewed and gray literature for published comparisons of *ex ante* and *ex post* cost estimates of specific social regulations (Harrington, Morgenstern, et al. 2000, hereafter HMN). Because of our backgrounds, we concentrated on environmental regulations, but took anything we could find. We asked colleagues for help and posted on various academic list servers. We received several replies to the effect that "plenty of studies out there; you shouldn't have any trouble." However, on checking these leads, we only found a handful that were genuine before-and-after comparisons of regulatory costs. In the end, we only found 25 cases, even after broadening our search to state regulations and regulations from other countries. In almost all cases, the constraint on case selection was the unavailability of an *ex post* study, or at least an *ex post* study that estimated regulatory costs. However, there were a few cases where it was the *ex ante* study that was missing, in part because we only selected cases where the *ex ante* estimate was prepared by



the government, or at least used by the government in the preparation of the RIA or environmental impact assessment (EIA) accompanying the proposed regulation.

The OMB study can be viewed as an update and extension of our work. Its sample includes 47 case studies, almost twice as many as our study included. Some of the additional studies are studies of regulations by agencies that we did not consider, including regulations promulgated by the NHTSA and the Nuclear Regulatory Commission (NRC). In addition, OMB includes some comparisons that appeared after our study came out.

The OMB study concludes that both benefits and costs are more likely to be overestimated than underestimated, but the benefit overestimates are larger than the cost overestimates. As a result, the benefit-cost ratio is overestimated far more often than it is underestimated. In other words, the predicted performance of the regulation is better than its actual performance. By comparison, HMN also find, similar to OMB, that both the total costs and total effects of regulations are overestimated, but we found no apparent bias in the estimate of unit costs or cost effectiveness.

### **3.2. Scoring Methods**

The criteria most often used by OMB to score the regulations are total benefits, total costs, and the benefit-cost ratio. Where they are calculated, the benefits are the monetized effects of the regulation if applicable; if the benefits are not monetized, then they are the quantitative effects of the regulation. OMB's bottom line is the change in benefit-cost ratio. If it is overestimated, that means the performance of the regulation is not as good as was predicted in the *ex ante* study.

For some rules in the OMB sample, either benefits or costs are not quantified in any way. For a number of OSHA safety rules there are no cost estimates, because the source of information is a paper by Seong and Mendeloff (2004), which focuses on comparing expected change in fatalities estimated in the RIAs with estimates of fatality reductions following implementation. For Department of Energy (DOE) appliance efficiency standards no benefit estimates are cited. Again, in the source document (Dale et al. 2002), the focus is on the estimates of the cost of energy efficiency. In principle, it should have been possible to determine the effects of the rule, because the change in the energy efficiency of the appliances should be known. In any event, for both these types of regulations it was assumed that the missing estimate (costs or benefits) were accurate for the purposes of calculating a change in benefit-cost ratio.

Pesticides were a slightly different case. The rules in question were bans on pesticide uses for certain crops in certain regions.

In the OMB analysis, the units in which benefits and costs were measured were not specified and not always the same. In most cases, the unit used in the comparisons was driven by what was used in the *ex ante* estimate; the *ex post* study was designed if possible to match the units used in the *ex ante* analysis. For major regulations, the benefits and costs were usually the aggregate benefits and costs of the regulation, because the *ex ante* totals were available in the RIA. But not all regulations had RIAs; for those, a benefit-cost analysis was not required. Ordinarily, all that was available for each regulation was a cost study. Thus, for the DOE appliance regulations, costs were expressed on a per unit basis, where units were the appliance itself. Benefits (presumably some measure of energy savings) were not estimated in the *ex post* analysis.

Making a distinction between unit costs and total costs made it easy to distinguish those cases where regulations were incompletely implemented. For EPA's vehicle inspection and maintenance program, for example, we found total costs to be overestimated and unit costs to be underestimated. In fact, it would not be unfair to say that total costs (and effects) were overestimated precisely because unit costs were underestimated. Unexpected difficulties and disappointing results implementing this program caused it to be used in only a few metropolitan areas, rather than in most nonattainment areas as EPA had originally envisioned. OMB's scoring of this rule was different, in part because OMB relied on a later study of the inspection and maintenance program in a single state, Arizona (Harrington et al. 2002).

In those cases where aggregate benefits and costs were reported, the OMB categories map nicely into HMN categories: costs into total costs, benefits into total effects, and the benefit-cost ratio into (the reciprocal of) our unit costs. Although the OMB benefits are usually monetized and ours are not, it would not matter whether physical effects or benefits were used unless the valuation function used in the *ex post* analysis differs from the one used in the *ex ante* analysis. With few exceptions, the valuation function remains the same.

As we had done, OMB then classifies the studies depending on whether the rule was an overestimate, underestimate, or an "accurate" estimate of the costs or benefits, as measured by the ratio of the *ex ante* estimates to the *ex post* estimates. OMB adopted our (quite arbitrary) standard of accuracy: An *ex ante* estimate was considered accurate if this ratio lay between 0.75 and 1.25.

For some types of regulations it is too difficult to quantify benefits, and in those cases OMB assumes that the benefit estimate is accurate (even in those cases where OMB reports that no benefits are calculated). In those cases, the cost-effectiveness or benefit-cost ratio is not reported or is reported on the basis of some production input or output measure. For example, the sample includes many pesticide regulations. For each, the benefit estimate is considered to be accurate because the regulation is a ban, so it is known what the quantity of that pesticide in that use will be after implementation: zero. This is not always a good assumption, because often the total quantity of pesticide used before the ban is not known. Costs of pesticide bans are almost always estimated as the additional costs per acre for such actions as extra weeding, use of a substitute pesticide, or acceptance of reduced yields.

In our analysis, the three criteria were the total cost of the rule, the total effectiveness of the rule, and the *unit costs*—the total cost divided by the total effectiveness. The measure of effectiveness was a physical quantity measure; for example, effectiveness of an air quality regulation would be measured by the total emissions reductions.

### 3.3. Case Selection

#### *Suggestions from the Public and Peer Reviewers*

In the draft Report to Congress (OMB 2005a), OMB lists a set of *ex post* studies and solicits help from reviewers and the public in an attempt to find more studies. In fact, among the 47 cases examined by OMB in the final 2005 Report to Congress (OMB 2005b) are several not mentioned in the draft report, including two studies of NRC regulations, six DOE energy efficiency regulations for household appliances (Dale et al. 2002), and a number of EPA pesticide regulations (Gianessi 2000). However, none of these studies is mentioned in either the comments or the peer reviews, suggesting that they arose not from the public solicitation, but from OMB's ongoing effort to survey the literature.

Some commenters, notably regulatory advocates such as OMB Watch, Public Citizen, and the Center for Progressive Regulation, were particularly active in suggesting additional studies, not only about omitted studies that should be included, but also *ex post* studies that should be dropped, usually because they were carried out by the wrong researchers.<sup>14</sup> The

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<sup>14</sup> For example, OMB Watch recommended that the Thompson et al. (2001) study of airbag regulation be dropped because the researchers' home institution, the Harvard School of Public Health, accepted contributions from firms for research projects.

primary source of the suggested cases were two papers (Goodstein 1997 and Ruth Ruttenger and Associates 2004) that cite several academic studies plus a large number of examples of individual firms. Not surprisingly, both papers are advocacy pieces, so the only cases that are discussed are those that support their point of view that regulatory costs are almost always severely overestimated and often have prompted innovations that reduce firms' total costs. Goodstein, in particular, cites regulations where costs are overestimated, including some claims not found elsewhere; his article was published in a popular magazine and contains no citations for those claims. Ruttenger also discusses several academic studies of overestimated regulatory costs, but none that had not already been addressed in the 2005 Report to Congress.

As for the carefully selected cases of firms where the costs of regulatory compliance were reportedly much less than expected or were actually negative (thereby supporting the so-called Porter hypothesis), they are perhaps suggestive of what the possibilities are, but their outcome-based selection precludes their use in an objective analysis. All they prove is that at *some* firms, social regulation may trigger a clever response that finds a way to comply with the regulation at a much lower cost than anticipated. No one ever doubted that such a happy outcome of regulation was possible. However, such examples are no substitute for the systematic study of a random sample of firms or plants.

Thus, the set of cases available to OMB for review included all the sources described in the draft Report to Congress (OMB 2005a), plus the additional NRC, energy efficiency, and pesticide studies mentioned above. Rather than including all the studies available from these sources, however, OMB did some picking and choosing to arrive at the sample. Table 2 lists the number of regulatory comparisons for each federal agency in the HMN paper in column 2 and in the OMB report in column 3; the minimum number of suitable studies that I was aware was available in April 2005, when the draft report went out for review, are in column 4. This last column includes not only the sources of which OMB was aware, but also a set of studies of mobile source regulations not mentioned in either the draft or final report. These omitted cases are discussed below to prepare the way for a new tally of regulatory comparisons.

#### *OSHA Health Standards*

The OMB sample does not include either the 1972 asbestos rule or the 1974 vinyl chloride rule, both of which were included in Harrington, Morgenstern et al. (2000). In the 2005 Report to Congress, OMB says in a footnote that those cases were omitted because there was no independent OSHA cost estimate; there were only estimates from industrial sources. However,

OTA (1995) reported that its estimate had been generated by OSHA's technical consultant, and that counts as an agency estimate.

**Table 2. Available Regulatory Comparisons by Agency**

Type of regulation (1)	HMN (2)	OMB (3)	Minimum available (4)
NHTSA	0	8	8
OSHA health	7	6	8
OSHA safety	1	7	7
NRC	0	2	2
DOE appliance	0	6	11
EPA mobile source	3	2	8
EPA pesticide	6	13	26
EPA other	5	3	5
Total	22	47	74
Total excluding EPA pesticide	16	34	48

### *DOE Appliance Standards*

Researchers at the Lawrence Berkeley National Laboratory recently compared actual costs to preregulatory estimates for 11 energy efficiency standards for household appliances promulgated between 1982 and 1995 (Dale et al. 2002). *Ex ante* estimates of the costs of these rules had been presented in six technical support documents (TSDs): 1982 and 1990 room air conditioners, 1982 central air conditioners, 1989 and 1995 refrigerators, and 1990 washing machines (clothes). Dale et al. (2002) estimate the actual cost of energy efficiency for all 11 of these appliances, based on retail price data collected by the researchers. Of these 11 standards, OMB chose only six. It was not the case that one standard was chosen from each TSD, because the 1982 room air conditioner and 1989 refrigerator TSDs are unrepresented. Apparently, OMB limited the selection to the most recent TSD for each type of appliance, but it is not clear why it did so.

A typo in the Dale et al. paper caused an inconsistency between two tables<sup>15</sup> and affected at least one of the cases chosen by OMB. The correct comparisons are in Table 3. Unit costs for appliance energy efficiency use a number of different units, so to focus on the comparisons of *ex*

<sup>15</sup> Larry Dale, personal communication to author, May 26, 2006.

*ante* and *ex post* cost estimates the table contains only the ratio of *ex ante* to *ex post* cost estimates. Thus, ratios greater than 1 indicate overestimates and less than 1, underestimates.

**Table 3. Appliance Energy Efficiency Costs: Estimated *Ex Ante*–*Ex Post* Cost Ratio**

Appliance type	Cost ratio
Room air conditioners–1982	
Small	1.7
Medium	2.3
Large	4.2
Room air conditioners–1990	
Small	6.2
Medium	1.6
Large	0.7
Central air conditioners–1982	
Small	1.6
Large	1.1
Refrigerators–1982	
All	1.3
Refrigerators–1995	
All	1.2
Clothes washers–1990	
All	1.3

Source: Dale et al. 2002

Grayed cells indicate cases in the OMB sample. The text says that there were insufficient data for an estimate for large room air conditioners in 1990, but this was an error, as was the reported estimate in one of the tables for medium room air conditioners. Of the 11 cases, in eight, *ex ante* costs are overestimated; in two, those costs are accurate; and in one, costs are underestimated.

#### *EPA Mobile Source*

The OMB sample includes two of the three mobile source emissions regulations found in the HMN sample—vehicle inspection and maintenance (I/M) and reformulated gasoline (RFG)—but leaves out the third, leaded gasoline. Also, OMB did not include results from a recent paper by two researchers in EPA’s Office of Technology and Air Quality (Anderson and Sherwood 2002). This paper contains comparisons for six EPA fuel regulations and 10 vehicle regulations implemented between 1992 and 2000. The paper was presented at a Society of Automotive Engineers (SAE) conference and was only published as an SAE paper, so perhaps OMB was unaware of it and was not informed of it by any peer reviewer or public commenter, including myself. If that is indeed what happened, I regret my role in the omission. Unlike other

air quality regulations, which estimate regulatory costs in terms of the cost per unit of emissions reduced, it is more common to estimate the costs of fuel standards as the incremental cost per gallon of fuel per unit of energy content (since some gasoline regulations, such as those that add ethers, alcohol or other substances with lower energy content).

Among the fuel regulations examined by Anderson and Sherwood (hereinafter AS) was Phase 1 RFG, giving us an unusual instance of two independent regulatory comparisons. The other comparison, included in both the HMN and OMB samples, were conducted by Anderson (no relation) and Rykowski (1997) (AR) and appeared in a collection of studies of EPA regulations with RIAs (Morgenstern 1997). Table 4 summarizes these two RFG studies.

**Table 4. Two *Ex Post* Comparisons of the Phase 1 RFG Rule**

	Year	<i>Ex ante</i> cost estimate, ¢/gal.	<i>Ex post</i> price differential, ¢/gal.	<i>Ex post</i> time period
Anderson and Rykowski	1997	2.3 <sup>a</sup>	4.0 <sup>b</sup> 2.6 <sup>c</sup>	Jan.-Aug. 1995
Anderson and Sherwood	2002	2.9–4.9	2.1	1996-1999

*Source:* Anderson and Rykowski 1997; Anderson and Sherwood 2002.

*Note:* All estimates have been normalized to 1995 dollars.

<sup>a</sup>Excludes estimated fuel economy penalty of 1.6 cents per gallon.

<sup>b</sup>Gulf coast spot differential.

<sup>c</sup>Gulf coast average refinery contract price differential.

As shown, these studies do not agree on the *ex ante* estimate. However, the AR estimate, including the fuel economy penalty, is 3.9 cents per gallon, the midpoint of the AS range, suggesting that the AS estimate includes the fuel economy penalty. There is still a bit of a puzzle, because the range reported by AR (including fuel economy penalty) is larger, ranging from 2.3 to 6.5 cents per gallon. Perhaps the authors of the two studies are looking at different versions of the RIA. Of course, for comparing to *ex post* fuel price differentials, the appropriate cost estimate is the one that excludes the fuel economy penalty. The two studies also disagree on the *ex post* price differential, but the probable explanation is the difference in time period. AR report that a shortage of methanol in 1995 probably pushed up the cost differential. Probably the best comparison, therefore, is to compare AR's *ex ante* estimate with AS's *ex post* estimate, and by those lights the EPA cost estimate is accurate.

Unlike the AS estimates, AR actually discuss the emissions reductions expected from introduction of Phase 1 RFG. However, there is no *ex post* assessment of actual emissions reductions to compare to this estimate. They do note that concerns about leaching of methyl tert-

butyl ether (MTBE) into groundwater caused several states to avoid adoption of Phase 1 RFG, and this is what accounts for OMB's assessment that benefits and costs are both overestimated. Regrettably, it will probably be impossible to identify the emissions reductions from particular fuel and vehicle regulations *ex post*. The seven fuel regulations and 11 vehicle regulations examined by AS were all enacted after 1990; the fuel regulatory sequence was contemporaneous with the vehicle sequence, and all more or less targeted the same pollutants: carbon monoxide, nitrogen oxides, volatile organic compounds (for gasoline vehicles), fine particulates (for diesels), and major toxics such as benzene. There is just too much multicollinearity to untangle the effects on emissions.

Anderson and Sherwood's comparisons for three other fuel regulations are shown in Table 5. As shown, the cost of the Phase 2 Reid vapor pressure control regulation is overestimated by a factor of 2.2, and the Phase 2 RFG and low-sulfur highway diesel regulations are estimated accurately, as long as an adjustment is made to account for unanticipated (and unconnected) price changes in MTBE. In almost every case, EPA's estimates are lower (and more accurate) than other estimates collected by AS, especially those from the industry.

**Table 5. Fuel Regulations Examined by Anderson and Sherwood**

	Effective date	<i>Ex ante</i> cost differential (¢/gal.)	<i>Ex post</i> differential (¢/gal.)	Time period
Phase 2 RVP control	1992	1.1 <sup>a</sup>	0.5 <sup>a</sup>	1993–98
Phase 1 RFG	1994	2.3	2.2	1996–99
Phase 2 RFG	2000	4.6–6.8 <sup>b</sup>	5.1 <sup>b,d</sup>	2000–01
500 ppm Sulfur highway diesel	1994	1.9–2.4 <sup>c</sup>	2.2 <sup>c</sup>	1995–99

*Source:* Anderson and Sherwood 2002.

*Note:* RFG = reformulated gasoline; RVP = Reid vapor pressure; ppm = parts per million.

<sup>a</sup>1995 dollars

<sup>b</sup>1997 dollars

<sup>c</sup>2000 dollars

<sup>d</sup>Adjusted for price changes of MTBE compared to 1995–99 average used in RIA. The unadjusted price differential was 7.2 cents per gallon.

As noted above, AS also analyze results of 11 vehicle standards. Unlike the fuel regulations, it was impossible to use vehicle price changes to estimate the cost of individual rules. Not only were the various vehicle standards regulations becoming effective simultaneously with other vehicle standards and with the fuel quality regulations, but many regulations were phased in over several years. For example, Tier 1 standards for light-duty vehicles were phased in so that 40 percent of vehicles had to comply by 1994, 80 percent by 1995, and 100 percent by



1996. Instead, AS use the cost estimates to estimate a pattern of expected cumulative cost increases for all vehicles from 1994 to 2001. They compare this trend to the Bureau of Labor Statistics price trends for motor vehicles. They find that by 1996 EPA had overestimated the cumulative cost of the vehicle rules by about \$150 per vehicle and by 2001 by about \$100 per vehicle, indicating some minor amount of cost underestimation between 1996 and 2001. AS attribute this outcome not to underestimation of the cost of later regulations, but to changes in the price of precious metals in 1997 and 1998 that affected the cost of catalytic converters required by vehicle emissions standards adopted prior to 1996. Correcting for the unanticipated change in precious metals prices, it appears likely that the costs of most of the regulations were overestimated by EPA; nonetheless, for the purposes of the tally below, all the vehicle emissions regulations enacted during the 1990s will be lumped together and counted as one.

A final and probably needless comment at this point: The estimates from industry sources again were serious overestimates (a cumulative \$500 per vehicle by 2001) of the actual compliance costs, although most of the error appears attributable to a single regulation, the estimate of the costs of on-board diagnostic systems that are required as of 1996

#### *EPA Pesticides*

In 1998, RFF commissioned Leonard Gianessi, then of the National Center for Food and Agricultural Policy, to conduct a series of *ex post* audits of pesticide cancellations and compare the results with the predictions of economic impact made during the cancellation process. He assembled these 31 case studies in a report (Gianessi 1999). The HMN paper includes the cases that were complete by the time they finished the working paper version. OMB also made use of this set of studies, using not only the ones that HMN had used, but also a selection of additional cases found in the Gianessi report. However, OMB did not use all the cases in the report but was silent on the rules that governed the selection of pesticide cases for the validation chapter.

After the completion of these pesticide studies, Gianessi and my RFF colleague Peter Nelson began work on an essay to discuss and summarize the results. For various reasons, that paper was never finished, but with the publication of the OMB validation chapter making prominent use of the studies, there is renewed interest in finishing the paper and making it available on the RFF Web site. The authors have solemnly assured me that the paper will be available in the near future (Gianessi and Nelson forthcoming). In what follows, I will make use of the findings of the report, supplemented by some further analysis of my own.

Of the 31 cases initially examined, Gianessi and Nelson find that six do not have sufficient information for estimating actual costs. Of the remaining 25, the cases are classified

much in the manner of the HMN or OMB studies, breaking up the cost estimates into the effect on yields, effect on treatment costs, and effect on total costs of pesticide use. In addition, Gianessi and Nelson note that often the effects of pesticide cancellations were modified by further EPA interventions, in the form of emergency exemptions or registrations of new pesticides. Thus, they also adjust the results to take into account these further actions, and they find the assessment of the accuracy of *ex ante* estimates changes considerably. Without discussing whether one should take into account these adjustments, Table 6 shows the results of the Gianessi-Nelson assessment for the cases that OMB did and did not select.

**Table 6. Disposition of All Pesticide Cases in Gianessi (1999)**

	Accurate	Over	Under	Unable to determine
<b>Unadjusted results</b>				
All cases	4	17	4	0
Cases in OMB sample	2	6	4	0
Cases not in OMB sample	2	11	0	0
<b>Adjusted results</b>				
All cases	10	9	3	3
Cases in OMB sample	4	4	3	1
Cases not in OMB sample	6	5	0	2
<b>Results excluding adjusted cases</b>				
All cases	4	9	3	0
Cases in OMB sample	2	4	3	0
Cases not in OMB sample	2	5	0	0

Criterion: Comparison of unit cost estimates

OMB selected 12 pesticide cases from Gianessi (1999) for the validation chapter. Comparison of the cases selected by OMB suggests that the sample is quite different from the set of cases not selected, regardless of whether we use unadjusted results, adjusted results, or simply omit the adjusted cases. OMB needs to explain their selection methodology.

### **3.4. Two Contested Cases**

In the validation chapter, OMB takes issue with the conclusions of two of the case studies in HMN: the OSHA regulation of powered platforms in 1989, and the effect of EPA's banning of the herbicide dinoseb in 1986. The powered platforms case was primarily a deregulation procedure, combining a number of additional or amended regulatory provisions with a provision that allowed a broader range of technological options than the existing standard did. According to the OTA case study, the new regulations were expected to add \$1.4 million annually to the

cost of compliance, but the greater flexibility of technology was expected to save \$3.1 million, resulting in a net annual saving of \$1.7 million. However, the new technology was adopted at only 20 to 40 percent of the rate that OSHA expected. OMB interpreted the low adoption rate as evidence that the cost of the newly available technologies had been underestimated, leading to a classification that (unit) costs were underestimated. In contrast, HMN relies on the OTA (1995) analysis, which reported that the low adoption rate was attributable not to underestimated costs, but to a serious slowdown in commercial building construction beginning in the late 1980s and continuing well into the 1990s. Therefore, we scored this as an accurate estimate of the unit costs and an underestimate of total costs. In the absence of any direct evidence that unit costs were underestimated, we stand by our original conclusion.

*Dinoseb.* At the time that dinoseb use was suspended, it was estimated that it was being used to treat 36 percent of peanut acres throughout the country. Other pesticides were available for growers to use, but they were known to be not as effective, and in the economic analysis EPA estimated that a ban would result in a 20 percent reduction in yield, costing growers \$70 million per year in lost revenue, and increase treatment costs by about \$1 million per year.<sup>16</sup> In early 1987, growers in the Southeast were granted an emergency exemption, made permanent in 1989, to replace dinoseb with paraquat. Initially, it appeared that paraquat was equally effective at weed suppression and yields were unchanged. In addition, the application rate of paraquat is significantly less, so there was a savings in treatment cost of \$0.4 million (rather than a cost of \$1 million).

Over time, it began to appear that paraquat was less effective, as yields began to decline in the late 1980s. On this basis, OMB judged that the costs of the dinoseb ban were underestimated. Of course, that depends on just what is being estimated, and the period that is estimated. The *ex ante* cost estimate applied only to a ban of dinoseb. What are observed are the effects of not only a dinoseb ban alone, but also a dinoseb ban in conjunction with the paraquat exemption. For this pair of actions, however, there was no *ex ante* study. To get OMB's result, it must have assumed that paraquat had been expected to eliminate growers' losses altogether, and there is no evidence in the Gianessi case study that this was the expectation. In contrast, HMN simply compares the original *ex ante* estimate of the dinoseb ban alone to the *ex post* result,

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<sup>16</sup> This was by far the largest economic impact predicted for any pesticide case examined in Gianessi (1999). Most impacts were under \$10 million per year in total costs.

which showed losses to growers to be less than the 20 percent predicted *ex ante*.<sup>17</sup> In retrospect, however, perhaps it would have been more appropriate to remove this case from the sample altogether, along with other pesticide cases where the outcome was changed by an emergency exemption after the release of the *ex ante* cost study.

### 3.5. Revised Tally

In this section, I take the OMB validation results and make the additions and adjustments discussed in the preceding section. To summarize:

- OSHA health regulations for asbestos (1972) and vinyl chloride (1974) are added.
- The DOE appliance energy efficiency standards evaluated by Dale et al. (2002) but not included by OMB are added.
- Four mobile source emissions standards evaluated by AS are added—three fuel quality standards and one (composite) vehicle emissions standard.
- The pesticide cases studies developed by Gianessi (1999) that are classified by Gianessi and Nelson (forthcoming) but not included in the OMB validation chapter are added.
- Only pesticide cases are used that have not been adjusted for emergency exemptions.
- The two contested cases discussed in Section 3.4 are discarded.

One can well wonder whether there is some characteristic of the cases that were left out of the original tally by OMB, something that distinguishes them from the cases that were included. If so, that characteristic is far from obvious. In the omitted cases one thing does jump out: in none of them was there an explicit estimate of benefits. However, there were numerous studies in OMB's original sample without benefit estimates, including the NRC studies, the

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<sup>17</sup> Contemporaneous with the ban on dinoseb was a prolonged drought in the southeastern growing region that began in 1986. The Gianessi account included data on annual yields and rainfall in Georgia, from which we are able to estimate a simple regression model to disentangle the effects of the ban and the drought. Yields in Georgia after 1986 were 16 percent below the average of 1974–85. The model suggests that 3 percent of the decline was due to reduced rainfall, and 13 percent was due to the pesticide substitution. Gianessi suggests other factors that may also have reduced yields, including changes in crop insurance that encouraged cultivation of marginal lands, depressed prices for other crops that encouraged peanut cultivation in continuous rotation, and changes in weed populations toward species on which paraquat was less effective.

Gianessi pesticide studies and the DOE appliance studies. For those latter two categories, indeed, the issue is why OMB took some of the cases but not others.<sup>18</sup>

The results are shown in Table 7. Note that results are now expressed in terms of benefit-cost ratios to conform to the units used in the OMB tally. That is, “over” means the benefit-cost ratio is overestimated in the *ex ante* study, so that regulatory performance is not as good as predicted in the *ex ante* study. For clarity, all the pesticide cases in the OMB chapter are thrown out, but most are thrown back in as part of the unadjusted pesticide cases in Gianessi (1999).

**Table 7. Benefit-Cost Ratios: Summary of Revised OMB Results with New Cases Added**

	Accurate	Over	Under
<b>OMB</b>			
In validation chapter	11	22	14
Excluding all Gianessi (1999) pesticide cases	2	4	6
Excluding remaining contested cases	0	1	0
Net OMB	9	17	8
<b>Added cases</b>			
OSHA health studies (asbestos and vinyl chloride)	1	0	1
DOE appliance standards (Dale et al. 2002)	0	1	4
Mobile source fuel regulations (AS)	2	0	1
Mobile source vehicle emissions regulations	0	0	1
Unadjusted pesticide cases (Gianessi (1999))	4	3	9
Net added cases	7	4	16
Final tally	16	21	24
Excluding pesticide cases	12	18	15

<sup>18</sup> In fact, in its tally OMB draws a peculiar distinction between the pesticide studies, which are described as having estimated benefits “accurately,” and the DOE energy efficiency studies, where benefits are said to be “not estimated.” OMB’s rationale for describing the pesticide benefits as “accurate” is that the regulations in question were bans, so that one knows *ex ante* that there will be a 100 percent reduction in the use of the affected pesticide. However, this argument overlooks two important considerations. First, while the percentage reduction may be known, the physical quantity of reduction may not be. Pesticide use data is notoriously imperfect, especially in spatial detail. Moreover, when a ban is implemented, farmers are generally permitted to use whatever stocks they have on hand; only production of the banned pesticide is halted. Pesticide inventory data is even less well understood than use data. Second, true benefit estimate would not stop at estimating physical quantities, but would also take into account health and ecological risks avoided, as well as additional risks assumed in the use of substitute products. As for DOE, it is true that Dale et al. (2002) did not estimate benefits of DOE appliance regulations. But such regulations are among the most quantifiable and monetizable of any social regulations issued by the federal government. For one thing, no appliance manufactured after the effective date of the regulation could be sold unless it met the standards. Moreover, the electricity consumption of every appliance is known, and electricity is a product traded in markets and thus is readily valued.

In the original validation chapter, OMB concludes that benefits and costs were both overestimated, but that benefits were overestimated more often, leading to the result that benefit-cost ratios are overestimated 50 percent more often than they are underestimated. In HMN, we also find that both regulatory effects and costs were overestimated, but we find that there was no bias in estimates of unit costs or cost effectiveness. In this review, using the results from 60 case studies including 26 not included in the OMB estimate, I find no bias in estimates of benefit-cost ratios. There are slightly more underestimates of the benefit-cost ratio in the entire sample, and slightly more overestimates in the sample with pesticide regulations excluded. This conclusion is at odds with the OMB conclusion in the validation chapter, which finds a surplus of overestimates regardless of whether pesticide studies were included.

### **3.6. Some Final Thoughts about Regulatory Comparisons**

Regardless of one's take on the outcomes discussed in the preceding sections, the results demonstrate the value of *ex post* analysis. It is frustrating that there is so little of it, especially when so many close observers, from all points of view, claim to be in favor of it. One difficulty is that there is no obvious or consistent source of funding. *Ex post* studies are not routinely done and appear largely for idiosyncratic reasons, largely dependent on the initiative of individual researchers. For example, in our earlier survey of comparison studies (Harrington, Morgenstern et al. 2000), it was striking how such a large fraction of the *ex post* studies we could find were economic incentive regulations. In part, we interpreted this as an avuncular interest on the part of economists, who have chosen to examine these particular policies because they find them more interesting from a professional point of view.

*Ex post* studies also must contend, typically, with serious problems of data acquisition and interpretation. Compliance cost data are likely to be considered business confidential by regulated firms, whose participation in cost studies is very likely to be voluntary anyway. And even if the data are obtained, there are likely to be difficult issues of joint cost allocation.

Finally, besides the absence of funding and incentives, barriers to the collection of data may also get in the way of producing *ex post* studies of regulation. The Paperwork Reduction Act of 1995 (PRA), as well as OMB regulations issued in its name, severely limit data collection from firms and individuals. In order to conduct a survey with more than nine respondents, any federal agency or organization conducting a project sponsored by a federal agency must submit the survey instrument for public comment and OMB approval.

In my peer review of the draft 2005 Report to Congress (OMB 2005a), I opined that the difficulty of conducting *ex post* studies of regulations is exacerbated by the PRA requirements. OMB blandly dismissed my concerns: “OMB’s view is that even validation studies must be adequately designed and justified, with an opportunity for public comment, which is what the Paperwork Reduction Act requires” (OMB 2005b, p. 51). This statement makes it sound as if the PRA review is a simple requirement that will ensure the use of sound survey methodology. Although the required public comment on surveys sounded like an unwarranted and unwelcome innovation in research methods, and although I had heard some horror stories about delay, I had no direct experience with the practical effect of strictures of the PRA. So to see if these views were commonly held among other researchers, I conducted my own informal survey by putting out an email to the subscribers to the resource economics list server promising confidentiality if they would tell me about their experience with the PRA.

I received about 20 replies, split about evenly between academic researchers and government researchers and project officers. Here is the comment I received that was most favorable to the PRA:

Going through the OMB review process on a survey is an expensive and time consuming process. Yes it discourages a lot of work from being done. On the plus side, it eliminates weak survey sampling from going forward (and in some instances from even being proposed). There are clearly ways though that the process could be streamlined. (Anonymous, personal communication with author)

More typical were the following two comments:

I have also never gone through the PRA procedures, but I have had funding agencies tell me, in no uncertain terms, that "NO SURVEY WORK IS TO BE DONE UNDER THIS CONTRACT!!!" because of the OMB requirements. And the idea that you have to go through public comment anytime you plan to do a survey seems ridiculous. That sounds more like the paperwork PRODUCTION act! (Anonymous, personal communication with author)

In my experience, OMB approval has been among the most onerous, time-consuming, and often frustrating processes in which I have been involved as a researcher. The efficiency loss from these requirements (in terms of lost researcher hours with often minimal gain in terms of improved methods) is astounding.... In some instances OMB will suggest changes that improve a

research effort. However, in most cases, my experience is that OMB will suggest changes to research protocols that have little support in the literature or in prior work. This is particularly true for stated preference research. OMB officers have a huge amount of power to suggest changes in research protocols as a condition of approval, no matter how out-of-line with standard research methods. (Anonymous, personal communication with author)

According to a recent report from the GAO (2006), the total federal paperwork burden in 2006 is 10.5 billion hours per year, 80 percent of which is attributable to the Internal Revenue Service, federal tax forms for individuals. Does OMB have any evidence that federally sponsored surveys have added unduly to this paperwork burden? After all, such surveys typically go out to respondents that number in the low thousands rather than the millions. Shouldn't it matter whether participation in the information collection is voluntary (as most survey research instruments are) or mandatory (as individual and corporate tax information collection is)? If the concern is about burdening the citizenry, why does OMB prohibit the use of monetary incentives to improve the response rate? According to one respondent to my little survey, that is what happened in the OMB review of his information-collection request.

Recently, the GAO convened a panel of information collection experts to assess the PRA and its implementation and to suggest changes. One such change that would make all the difference to the conduct of government surveys would be to change the definition of *information collection* (GAO 2006). At present it includes all collections that go out to 10 or more persons. If the definition were changed to raise this number to, say, 2,000 persons, or to exclude voluntary solicitations, it would hardly matter to the national paperwork burden but could make a huge difference in the ability of agencies to carry out or sponsor research to improve policymaking or to generate information about actual policy performance. Inasmuch as better federal policymaking is an important goal of OMB, it is a puzzle to me why OMB appears to support retention of the 10-person rule and seems to be regarded so generally as obstructionist when it comes to review and approval of surveys.

In any event, I suggest that a very useful *ex post* examination that OMB itself could do would be to examine the effects of the PRA on the ability of agencies to conduct scientific surveys, as well as the actual burden of permitted surveys on the respondents.



#### 4. Conclusion

I draw the following conclusions from this review of the 2005 Report to Congress.

First, OMB conducts the annual survey, as is the case with so many of its regulatory review activities, in a highly partisan atmosphere. Its critics have different methods for assessing cost of regulations, methods that not coincidentally tend to produce results that favor their own interests.

Second, it is probably true that there are significant costs and benefits of regulation that are not counted in the RIA. Some of the uncounted costs include the efforts of a firm subject to a new regulation to determine what it requires and to figure out how to comply (probably small) and the effect on rent seeking (which could be more substantial for some regulations, but probably not equal to the total transfers some authors have asserted). Examples of uncounted benefits would include the benefits of ecological preservation.

Third, of the costs and benefit items that are counted in RIAs, the data from validation studies suggest that both benefits and costs are overestimated. In the validation chapter, OMB argues that benefits are overestimated more often than costs. However, this conclusion results from an unexplained and often unusual selection of cases to include in the sample. A more inclusive list suggests that benefits and costs are overestimated with about equal frequency.

Fourth, the number of *ex post* analyses of regulations remains small, despite being highly valued by government officials, independent policy analysts, advocates, and other close observers of regulatory matters. There are insufficient incentives for the right types of institutions to conduct such investigations. The organizations with incentives to do so are those with an interest in the outcome, and that interest may cause the results not to be trusted. External funds must be provided to give disinterested researchers an incentive to conduct unbiased and independent studies. In addition, other policies, in particular the limitations on surveys imposed by the PRA, erect artificial barriers to the collection of data that are often essential to the successful completion of an *ex post* study.

Finally, one point that is often forgotten in discussions about the actual cost of regulations: Estimation of costs is much easier for some kinds of regulation than for others. For cap-and-trade programs, the marginal cost of compliance *ex post* is equal to the permit price for every participant in the market. For emission-fee programs, the marginal compliance cost equals the unit fee, so it is the same *ex post* as it is *ex ante*. The total cost, of course is not quite so easy

to get, since one must still estimate the cost of the inframarginal units. Nonetheless, even total cost is much easier to estimate than it is for direct regulatory programs, because of the anchoring provided by knowing the cost at one point.

## References

- Anderson, Robert, and Richard Rykowski. 1997. Reformulated gasoline. In *Economic Analyses at EPA: Assessing Regulatory Impact*, edited by Richard D. Morgenstern. Washington, DC: Resources for the Future.
- Anderson, John, and Todd Sherwood. 2002. Comparison of EPA and other estimates of mobile source rule costs to actual price changes. Society of Automotive Engineers (SAE) paper 2002-01-1980. Presented at the SAE Government Industry Meeting. May 14, 2002, Washington, DC.
- Christansen, G., and R. Haveman. 1981. Public regulations and the slowdown in productivity growth. *American Economic Review* **71** (2): 320–25.
- Crain, W. Mark. 2005. *The Impact of Regulatory Costs on Small Firms*. Office of Advocacy. Washington, DC: Small Business Administration. <http://www.sba.gov/advo/research/rs264tot.pdf>
- Crain, W. Mark, and Thomas D. Hopkins. 2001. *The Impact of Regulatory Costs on Small Firms*. Office of Advocacy. Washington, DC: Small Business Administration. <http://www.sba.gov/advo/research/rs207tot.pdf>
- Dale, Larry, Camille Antinori, Michael McNeil, and James McMahon. 2002. Retrospective evaluation of declining prices for energy efficient appliances. Proceedings of the ACEEE 2002 Summer Study on Energy Efficiency in Buildings. August 18-23, Pacific Grove, CA. Available at [http://ees.ead.lbl.gov/eesDev\\_2/publicationsDetails.cfm?Publication\\_ID=4729](http://ees.ead.lbl.gov/eesDev_2/publicationsDetails.cfm?Publication_ID=4729).
- Denison, Edward. 1979. *Accounting for Slower Economic Growth*. Washington, DC: Brookings Institution.
- Gianessi, Leonard. 1999. Cost of pesticide regulation: Thirty-one case studies. Paper prepared for Resources for the Future, Washington, DC. Available at [http://www.croplifefoundation.org/cpri\\_archives.htm](http://www.croplifefoundation.org/cpri_archives.htm).
- Gianessi, Leonard, and Peter Nelson. Forthcoming. Thirty-one pesticide case studies: A Synthesis. Working paper, Resource for the Future, Washington, DC.
- Goodstein, Eban. 1997. Polluted data. *The American Prospect* **8** (35): 64–69.

- Government Accountability Office (GAO) 2006. Paperwork Reduction Act: New Approaches Can Strengthen Information Collection and Reduce Burden. Statement of Linda D. Koontz, Director, Information Management. Testimony Before the Subcommittee on Regulatory Affairs, Committee on Government Reform, House of Representatives.
- Hahn, Robert, and John Hird. 1991. The costs and benefits of regulation: Review and synthesis. *Yale Journal of Regulation* **8** (1): 233–78.
- Harrington, Winston, Virginia McConnell, and Amy Ando. 2000. Are vehicle emission programs living up to expectations? *Transportation Research Part D* **5**: 15372.
- Harrington, Winston, Richard D. Morgenstern, and Peter Nelson. 2000. On the accuracy of regulatory cost estimates. *Journal of Policy Analysis and Management* **19** (2): 297–322.
- Hazilla, Michael, and Raymond J. Kopp. 1990. The social cost of environmental quality regulations: A general equilibrium analysis. *Journal of Political Economy* **98** (4): 853–73.
- Hopkins, Thomas. 1995. *Profiles of Regulatory Costs*. Report to the U.S. Small Business Administration, U.S. Department of Commerce, National Technical Information Service #PB96 128038 (November).
- Jorgensen, Dale, and Peter Wilcoxon. 1990. Environmental regulation and U.S. economic growth. *Rand Journal of Economics* **21** (2): 314–40.
- Magat, Wesley A., Alan Krupnick, and Winston Harrington. 1986. *Rules in the Making: A Statistical Analysis of Regulatory Agency Behavior*. Washington, DC: Resources for the Future.
- Mendeloff, John. 1988. *The Dilemma of Toxic Substance Regulation*. Cambridge, MA: MIT Press.
- Morgenstern, Richard D., ed. 1997. *Economic Analyses at EPA: Assessing Regulatory Impact*. Washington, DC: Resources for the Future.
- Nicoletti, Giuseppe, Stefano Scarpetta, and Olivier Boylaud. 1999. Summary indicators of product market regulation with an extension to employment protection legislation. Economics department working papers 226, Organization of Economic Cooperation and Development. [http://www.oecd.org/findDocument/0,2350,en\\_2649\\_33733\\_1\\_119684\\_1\\_29\\_1,00.html](http://www.oecd.org/findDocument/0,2350,en_2649_33733_1_119684_1_29_1,00.html)
- OMB. 2000. *Report to Congress on the Costs and Benefits of Federal Regulations*.

- OMB. 2004. *Progress in Regulatory Reform: 2004 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities*. Available at [http://www.whitehouse.gov/omb/inforeg/regpol-reports\\_congress.html](http://www.whitehouse.gov/omb/inforeg/regpol-reports_congress.html)
- OMB. 2005a. *Draft 2005 Report to Congress on the Costs and Benefits of Federal Regulations*. Available at [http://www.whitehouse.gov/omb/inforeg/regpol-reports\\_congress.html](http://www.whitehouse.gov/omb/inforeg/regpol-reports_congress.html)
- OMB. 2005b. *Validating Regulatory Analysis: 2005 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities*. Available at [http://www.whitehouse.gov/omb/inforeg/regpol-reports\\_congress.html](http://www.whitehouse.gov/omb/inforeg/regpol-reports_congress.html)
- OMB Watch. 2005. *Comments on White House's 2005 Draft Annual Report on Costs and Benefits of Federal Regulations*. Available at [http://www.whitehouse.gov/omb/inforeg/regpol-reports\\_congress.html](http://www.whitehouse.gov/omb/inforeg/regpol-reports_congress.html)
- Office of Technology Assessment (OTA). 1995. *Gauging Control Technology and Regulatory Impacts in Occupational Safety and Health: An Appraisal of OSHA's Analytic Approach*. OTA-ENV-635. Washington DC: Government Printing Office.
- Organization for Economic Cooperation and Development. 1999. *Regulatory Reform in the United States*. OECD Reviews of Regulatory Reform. Paris: OECD.
- Posner, Richard A. 1975. The Social Costs of Monopoly and Regulation. *Journal of Political Economy* **83** (4): 807–28.
- Putnam, Hayes, & Bartlett, Inc. 1980. *Comparisons of Estimated and Actual Pollution Control Capital Expenditures for Selected Industries*. Report prepared for the Office of Planning and Evaluation, Environmental Protection Agency. Cambridge, MA: Putnam, Hayes, & Bartlett, Inc. Photocopy.
- Ruth Ruttenberg and Associates. 2004. Not too costly after all: An examination of the inflated cost estimates of health, safety and environmental protections. Paper prepared for Public Citizen Foundation, Washington, DC.
- Seong, Si Kyeung, and John Mendeloff. 2004. Assessing the accuracy of OSHA's projected benefits of new safety standards. *American Journal of Industrial Medicine* **45** (4): 313–28.

Thompson, Kimberly M., Maria Segui-Gomez, and John D. Graham. 2002. Validating benefit and cost estimates: The case of airbag regulation. *Risk Analysis* **22** (4): 803–11.

Tullock, G. 1967. The welfare cost of tariffs, monopolies, and theft. *Western Economic Journal* **5**: 224–32.

## Appendix. Disposition of Final Rules

In fiscal 2004, 4,088 final rules were published in the *Federal Register*, which means that for each of the 11 rules whose benefits and costs appear in the 2005 OMB Report to Congress, nearly 400 rules do not appear. This appendix explains briefly the reasons why.

First, as shown in Figure 1, more than 90 percent escapes OMB review altogether. The bulk of these are administrative orders and similar quasi-judicial actions that pertain to individual firms or individuals and issued by all agencies. Others are regulations issued by certain “independent” regulatory agencies that are exempt from the executive order, such as the Federal Reserve, the Federal Communications Commission, and the Nuclear Regulatory Commission.

Of the 364 that are under OMB purview, only 45 are considered “major” rules, generally defined to be rules expected to have an expected economic impact exceeding \$100 million annually. Most of the remainder is excluded from close consideration because they are budgetary programs, supposedly without costs or benefits, or rules for which benefits or costs were not estimated.

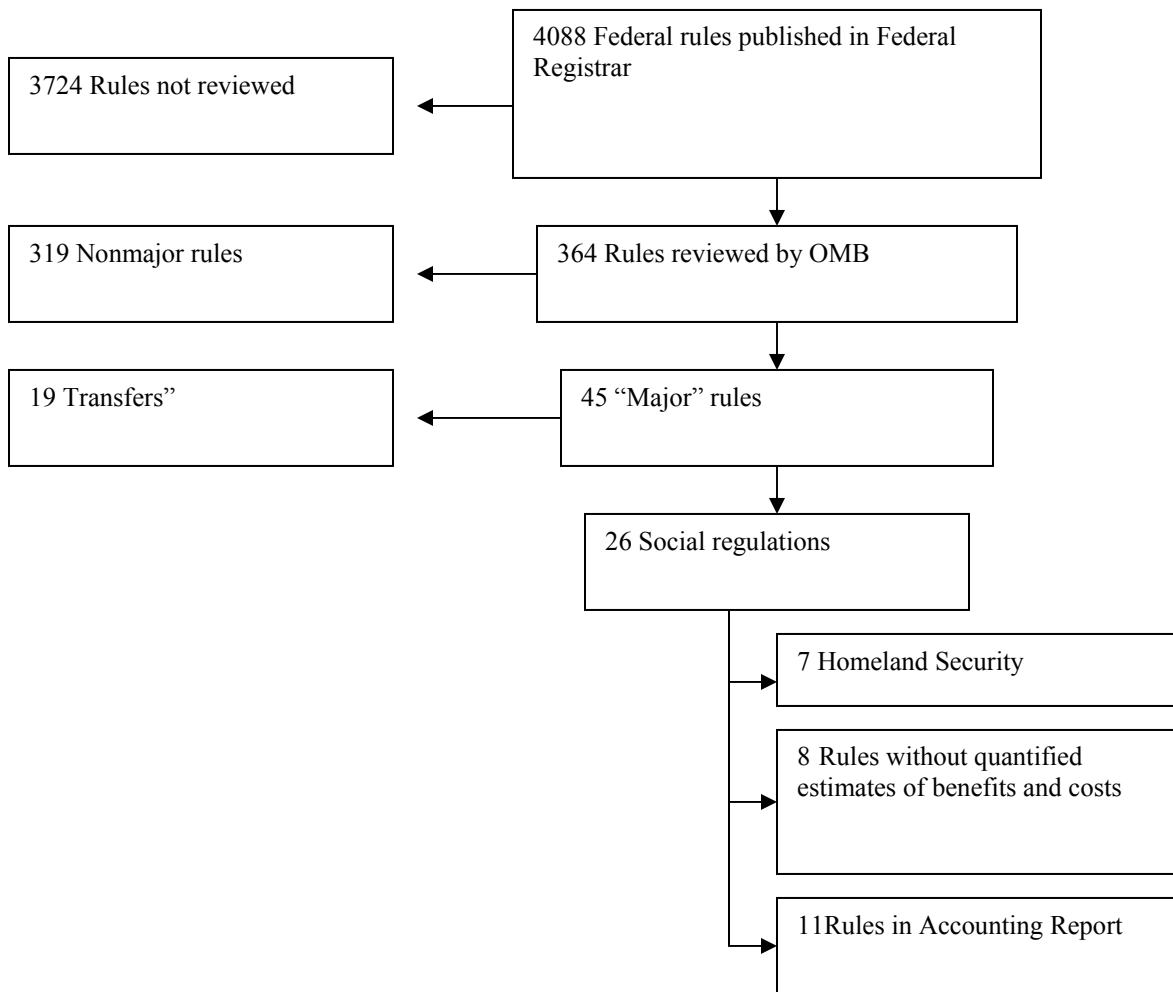
Of the remaining 45 major rules, 19 are removed from further consideration because they are “transfer programs,” which, according to OMB, have no costs since they simply transfer resources from taxpayers to program beneficiaries. Appendix Table A-1 in the Accounting Report contains some details on the remaining 26 major rules. Besides the 11 that make it into the estimates of the aggregate cost of regulation, the others are regulations missing either benefit or cost estimates or both.<sup>19</sup> Half of those are antiterrorism regulations implemented by the DHS and HHS. These have costs but no benefits.

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<sup>19</sup> One minor complaint here: The regulations listed in Table A-1 should be separated neatly into the three categories listed here; it takes a little cross-checking to figure out which regulation is in which category.

Figure

Figure 1. Disposition of Federal Rules by OMB in 2004



Source: OMB 2005B