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AEI-BROOKINGS JOINT CENTER FOR REGULATORY STUDIES

A Statistical Analysis of the Quality of Impact Assessment in the European Union

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Working Paper 07-09

May 2007

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Executive Summary

In 2002, the European Union required that an impact assessment be done for all major initiatives, including many regulations, directives, decisions, and communications. This paper is the first paper to statistically analyze these impact assessments using the largest available dataset. As a benchmark, we compare our results in the EU with recent results on the quality of regulatory analysis in the U.S. We score impact assessments using a number of objective measures of quality, such as whether a particular assessment provides any quantitative information on costs or benefits, and use the scores to develop two indices of quality.

Our analysis suggests that European impact assessments typically exclude important economic information and their quality may have gotten worse from 2003 to mid-2005. We recommend that more economically significant EU initiatives receive higher levels of scrutiny, as is currently done for proposed regulations in the U.S.

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I. Introduction

Over the past several decades, some scholars have critiqued the application of economic analysis, such as cost-benefit analysis, to problems in public policy (Ackerman and Heinzerling, 2002). Other scholars and policy makers have defended economic approaches to analyzing important public policy issues. For example, Justice Breyer argues that government needs to set regulatory priorities differently so that more lives can be saved with a given level of expenditures (Breyer, 1993).[1]

The debate over the use of economic analysis as a tool in regulatory decision making is more than academic. Governments throughout the world are requiring extensive use of cost-benefit analysis and related tools as a way of informing key regulatory decisions and reforming the regulatory process. In 1981, President Reagan set up an office within the U.S. Office of Management and Budget (OMB) whose primary aim was to improve the quality of regulations. More recently, Prime Minister Tony Blair (2005) argued in a speech that risk cannot be eliminated, that it should be managed wisely, and that impact assessments were needed to help set priorities. In May 2005, Prime Minister Blair set up the Better Regulation Executive to reduce and improve regulation.[2]

In the U.S., a regulatory impact analysis (RIA) has been required for "major" regulations for the past 25 years. Such major regulations typically have annual economic impacts that exceed $100 million (OMB, 2005) An RIA usually involves some sort of cost-benefit analysis, which may take considerable resources. Therefore, it is important to determine when such analysis is likely to produce information whose value exceeds the cost of the analysis (Raiffa, 1968). In the U.S., the "value of information" problem is taken into account by requiring a detailed analysis only of major regulations.

The European Union followed suit in 2002 when it required an impact assessment (IA) of all initiatives included in the Annual Policy Strategy or the Work Program (European Commission, 2002). These assessments are supposed to analyze the likely economic, social, and

[1] Sunstein (2002) also supports the expanded use of cost-benefit analysis.
[2] See the Better Regulation Executive's website, available at http://www.betterregulation.gov.uk/.

environmental impacts of specific policies. The scope of European impact assessment is broader, including not only major regulations, but all regulations, directives, communications, and other initiatives. The EU attempts to solve the value of information problem through the principle of proportionate analysis, where the depth of the analysis is proportional to the likely impact of the initiative (European Commission, 2004).

To make prudent recommendations for improving the use of cost-benefit analysis in policy settings, we need some measure of how well such analyses are actually done, since the utility of a particular analysis depends in large part on its quality.[3] The purpose of this paper is to examine how impact assessment is actually performed in the EU and to identify areas for improvement.[4] We examine the quality of the first 94 European IAs using a scorecard approach. This is the largest dataset of its kind. An earlier examination of 70 IAs was done by Renda (2006). We add to his contribution by using statistical analysis on the Europeans IAs similar to analysis done by Hahn and Dudley (2007) on U.S. RIAs. We also attempt to take into account the principle of proportionate analysis.

Our analysis suggests that European IAs typically exclude important economic information and that their quality may have gotten worse from 2003 to mid-2005. Some of these differences may be attributable to the principle of proportionate analysis since, according to the principle, substantial analysis will not be performed for some low-impact IAs. Thus, it would be unfair to hold IAs that were supposed to be less detailed to the same standards as IAs that were not. We attempt to control for this principle by separately examining the quality of IAs prepared for binding and nonbinding initiatives. We find that the principle is not likely to account for the low quality since even the "best" European IAs are missing important economic information.

We believe the EU should consider more carefully scrutinizing economically significant initiatives, similar to what is done in the U.S. for proposed regulations. Section II of the paper provides some background on the U.S. and European experience with economic analysis. Section III reviews methods for assessing quality and the results of early assessments of European IAs. Section IV describes the results of our analysis. Section V concludes.

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[3] We are not measuring the impact of the process, though we think this is an important area of inquiry (Farrow, 2000).

[4] Morrall (1986) first used information from regulatory impact analyses to calculate the cost effectiveness of various regulations in the U.S., demonstrating the need for reform. Similar approaches have been used by Tengs *et al.* (1995) and Tengs and Graham (1996). We examine the quality of the analyses themselves.

II. Regulatory Evaluation in Europe and the U.S.

The European Union introduced impact assessment in 2002 as a way to improve policy design. The United States has required regulatory impact analyses since 1981. We provide a brief discussion of both approaches to highlight key similarities and differences.

A. The U.S. Example

The U.S. was the first country to require economic analysis of at least some proposed regulations. Over the last two decades, both Congress and the Executive Branch have initiated regulatory reforms in order to improve assessment of the economic impacts of regulation and to encourage the development of more effective and efficient regulations (Sunstein, 2002; Hahn *et al.*, 2000). For example, Presidents Ronald Reagan, George H. W. Bush, Bill Clinton, and George W. Bush directed all agencies to perform economic analyses of major regulations that show whether a regulation's benefits are likely to exceed its costs and whether alternatives to that regulation would be more effective or less costly. Each president also attempted to increase agency accountability for decisions by requiring that OMB review all major regulations. More recently, Congress has also embraced regulatory reform. For example, Congress inserted analytical requirements and accountability provisions into a number of laws, such as the Unfunded Mandates Reform Act of 1995. In addition, Congress has passed laws that require OMB to produce regular reports on the costs and benefits of federal regulation (*e.g.*, OMB, 2005).

Early efforts to improve the regulatory process can be traced to Presidents Nixon, Ford, and Carter, but President Reagan was the first to implement a formal process that required economic evaluation (Weidenbaum, 1997). The most prominent and far-reaching of the regulatory reform efforts were President Reagan's Executive Order 12291 and President Clinton's Executive Order 12866.[5] Both executive orders require agencies to prepare a regulatory impact analysis for all major federal regulations.[6] The RIA is then sent, along with the

[5] President George W. Bush recently amended Executive Order 12866. The basic thrust of the new order is the same with regard to economic analysis of regulations. But the new order also requires more careful scrutiny of regulatory guidance from agencies. Hahn and Litan (2007) provide a summary of the changes.

[6] There are subtle differences between the two executive orders. Clinton's Executive Order 12866 places more emphasis on distributional concerns and public transparency of the regulatory process. Executive Order 12866 also requires agencies to show that the benefits "justify" the costs, in contrast to Reagan's Executive Order 12291, which requires that the benefits "outweigh" the costs. Both allow for analyzing some effects in qualitative terms only.

proposed regulation, to analysts at the OMB, who review the proposal. The OMB either offers suggestions for improving the proposal or accepts it as is. Such centralized oversight can help with interagency coordination, setting priorities, and implementing more cost-effective and economically efficient regulation.

OMB has issued guidelines and memos instructing agencies on how to comply with the relevant executive orders (OMB, 1992; OMB, 1996). The EPA also issued its own set of guidelines, detailing how RIAs should comply with the executive orders (EPA, 1983; Snyder, 1996). The basic instructions, such as quantifying as many costs and benefits as possible and evaluating alternatives, have remained constant over the past twenty-five years.

B. European Impact Assessment

Regulatory reform in Europe is more recent. In 1986, the United Kingdom introduced compliance cost assessment, which provides an estimate of the impact of proposed legislation on firm costs. It did not implement a detailed cost-benefit procedure until 1998 (Renda, 2006). The Organization for Economic Cooperation and Development (OECD), whose members include many European countries, presented the first set of policy recommendations for regulatory reform that included cost-benefit analysis in 1997. Five years later, within the framework of the Better Regulation package, the European Commission (EC) of the EU introduced the impact assessment program as a tool to increase the quality of policy decisions (EC, 2002).

The Commission requires an IA for all major initiatives, including many regulations, directives, decisions, and communications (EC, 2002).[7] Thus, economic analysis is not limited to major regulations, as it is in the U.S.

These initiatives include binding legal instruments (regulations, directives and decisions) and nonbinding legislative proposals (communications, White Papers).[8] A regulation is binding and addressed to everyone, creating law that takes immediate effect in all Member States. A directive is addressed to Member States to harmonize national legislation in certain fields and, though the results are binding, the choice of the form and method is usually up to the individual

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Reagan's Executive Order 12291 acknowledges that some effects "cannot be quantified in monetary terms," while Clinton's Executive Order 12866 specifically calls for quantifiable measures "to the fullest extent that these can be usefully estimated."

[7] Some types of initiatives are excluded from impact assessment in Europe, such as Green Papers, periodic Commission decisions and reports, and technical updates. See Communication from the Commission (2002). For a more detailed treatment of the European experience, see Renda (2006).

[8] These definitions were found on Eur-Lex, Europe's law database, available at http://eur-lex.europa.eu/.

Member States. A decision is like a regulation, except that it is addressed to specific individuals. Communications and White Papers are usually proposals to the community that may lead to European Union action. Although the coverage is very broad, the impact assessment model does not apply to regulations or legislation implemented by individual member states. Most member states today apply some form of impact assessment on their own proposed legislation, but the model is different from the one adopted at EU level (Renda, 2006).

Originally, the Commission instructed departments of the EU responsible for specific areas (Directorate Generals, or DGs) to prepare a preliminary IA. The Commission then selected proposals that should undergo a more detailed analysis, called an extended impact assessment. The Commission took into account whether the proposal was likely to have substantial social, economic, and environmental impact and whether the proposal represented a major policy reform in one or several sectors (Renda, 2006). In 2004, the term "extended impact assessment" was replaced with "impact assessment" to reflect the principle of proportionate analysis. This principle held that even in the extended stage, an IA might not be very detailed if the initiative's impact is not significant (EC, 2004). If used correctly, this principle can allocate resources to assess the most important initiatives. It is an important factor to take into account when evaluating these economic analyses.

The EU has developed guidelines for implementing the impact assessment program (EC, 2002). It updated and improved the guidelines in June 2005, but most of the IAs in our database are pre-June 2005 (EC, 2005). The guidelines present a set of basic questions, minimal analytical standards, and a common reporting format (EC, 2002). The department in charge of the analysis is required to express impacts "as concretely as possible in qualitative, quantitative, and where possible, monetary terms" (EC, 2002). Unlike in the U.S., there are no specific guidelines for quantitative analysis, such as using a particular range for discount rates or the value of a statistical life.[9]

III. Assessing the "Quality" of Impact Assessment

Although the quality of an economic analysis is difficult to measure, some way to measure quality is vital to the effectiveness and desirability of economic analyses to promote

[9] The updated guidelines do suggest a 4% discount rate and €1.0 million as a best estimate for the value of preventing a fatality in a risk-reduction environmental context (EC, 2005).

sound decision making. We discuss our method for assessing the quality of European IAs as well as what is currently known about their quality.

A. Method

Currently, there are three ways to assess the quality of economic analyses. One is to use experts to examine the assumptions and results of a particular analysis. This method allows for in-depth analysis of particular issues germane to a specific regulation. It can also differentiate an analysis that is of bad quality because it is fundamentally wrong in its assumptions from an analysis that is of bad quality because it does not include key parameters or consistent modeling assumptions. The main disadvantage of this approach is that the results may be subjective, meaning that they are not easily generalized or replicated.

A second approach is to use an estimate of some parameter, such as net benefits or cost effectiveness, from an *ex ante* analysis and compare it with an *ex post* assessment.[10] This approach has the benefit of using an observed measure to gauge the quality of the economic analysis, with the assumption that the *ex post* estimate is a better measure of the actual impact of the policy. The greater the similarities between the two measures, the more accurate the *ex ante* analysis was in predicting economic impact and, hence, the better it was as a decision-making tool. The main disadvantages of this approach are that it is contingent on the available information at the time of the study and it presumes *ex post* estimates are more accurate, which may or may not be true. For any specific study, random outcomes create deviations from the expected value that may have been reported *ex-ante*. In addition, because *ex post* studies are costly, relatively few are performed. It would be hard to use this approach to examine the quality of many impact assessments.

A third approach is to use a "scorecard" to assess whether an analysis meets key objective criteria such as whether it monetized at least some costs and benefits, whether it considered alternatives, and whether it used consistent modeling assumptions.[11] We believe any high-quality analysis should contain all or most of these criteria.[12] The advantages of this approach are that it is easily generalized, replicable, and inexpensively allows comparison of a

[10] For example, see Harrington *et al.* (2000) and OMB (2005).
[11] See Table 1 for a complete list of scorecard items.
[12] See the Government Accountability Office (GAO) (2005), discussing why standardization of criteria is important in cost-benefit analysis. The GAO advocates a similar use of a scorecard to synthesize information consistently.

large number of different analyses. The main disadvantage of this approach is that the relationship between a score may not always provide a useful measure of quality. For example, an IA can score highly but still be of poor quality if other elements that are less easily evaluated are inaccurate. Similarly, an IA can receive a low score but still be of relatively good quality if many of the items that it did not include were unknowable or difficult to determine.[13] Despite these drawbacks, we believe that the scorecard approach is useful. For purposes of this analysis, we assume scores and quality are correlated. In other words, an IA with a high score is likely to be of good quality while an IA with a low score is likely to be of poor quality. For simplicity, we use the scores on the scorecard as indicators of quality.

Previous studies have used the scorecard approach on both U.S. and EU economic analyses (Hahn *et al.*, 2000; Hahn and Dudley, 2007; Renda, 2006). Hahn and Dudley (2007), which provides the most recent analysis of U.S. data, focused on EPA RIAs across three presidential administrations. They found that scores are generally low, meaning that a significant percentage of the analyses done by the EPA are not consistent with elements of OMB guidance and standard economic practice because they do not report some basic economic information. In addition, statistical analysis revealed no significant differences among scores for RIAs across time, administration, and offices within the EPA.

B. Early Assessments of the Quality of European Impact Assessments

Researchers are beginning to evaluate the European system, and the results appear to have some similarities with the United States. For example, several impact assessments fail to discuss many important categories of information.

One of the earliest investigations by Lee and Kirkpatrick (2003) concluded that the first six IAs completed by the European Commission were "disappointing." Opoku and Jordan (2004), Vibert (2004), and Lussis (2004) each found considerable room for improvement in European IAs as well. Vibert analyzed the first 20 IAs performed by the European Commission. He used a scorecard approach similar to ours and found that only half of the IAs quantified costs and benefits, only 11 included information on market alternatives, and only two had provided for peer review. Vibert (2004) concluded that the impact assessment method is a positive step

[13] Though an economic analysis of actually high quality can theoretically get a low score on the scorecard, we believe this is unlikely.

toward better decision making, but that some aspects, such as the market analysis and the consultation process, need to be improved. Opoku and Jordan (2004) analyzed the 41 IAs completed in 2003 and 2004 and concluded that improvements, such as clearer guidelines and more thorough consultations, are necessary to resolve some of the deficiencies. Lussis (2004) examined 13 IAs and argued that there is a "methodological blank" in the identification and assessments of impacts and that there is a need for greater consistency.

More recently, the Environmental Assessment Institute (IMV, 2006) studied 58 IAs in 2004 and 2005. They concluded that the assessments in their study "do not in general give an overview of costs and benefits associated with the proposals analysed" (IMV, 2006).

Finally, Renda (2006) analyzed the first 70 IAs, from January 2003 through June 2005.[14] By examining summary statistics, he found that impact assessments frequently do not contain important economic information and that there appears to be a decrease in quality and comprehensiveness of assessment over time. His results were based on a scorecard similar to the one used in Hahn and Dudley (2007). Our dataset includes all of the IAs in Renda (2006) and 24 more IAs, making it the largest assembled dataset of its kind.[15] This study improves on Renda (2006) by using statistical analysis to find patterns in the data that might help explain the low scores. We will also attempt to take into account the principle of proportionate analysis.

IV. Results

Our general approach is to utilize two indices of quality, described below, and explore how these indices are correlated with different variables, such as a time trend or the type of initiative. Index 1 contains 16 scorecard items and Index 2 contains three items.[16] In particular, Index 2 contains scorecard items recording whether the IA included the most fundamental economic information: a point or range estimate of total costs; a point or a range estimate of total

[14] Preliminary impact assessments were not included in the sample.
[15] All of the 94 impact assessments were scored by Andrea Renda for consistency.
[16] Index 1 includes items 1-3, 9, 11-13, 21, 33, 35, 37-40, 43, and 53. All questions are summarized in Table 1. The correlation between Index 1 and Index 2 is 0.74 for the U.S. RIAs and 0.82 for the EU IAs. This means that an economic analysis that scored well on one index is likely to score well on the other index.

benefits; and a calculation of either net benefits or cost effectiveness.[17] The two indices are normalized to range from 0 to 1.[18]

The sample, which is the largest of it kind, contains the first 94 IAs completed by the European Commission.[19] Thirty IAs were done for communications, 26 for decisions, 23 for directives, and 18 for regulations.[20]

We focus our analysis on the European IAs and use the results for the U.S. RIAs from Hahn and Dudley (2007) as a baseline. Although we compare Renda's results with those of Hahn and Dudley, it is important to recognize that the studies are different, involving different scorers, different samples, and different time periods. The U.S. data addresses the performance of one regulatory agency across time, while the EU data includes all the IAs done from 2003 to mid-2005.

Three results about European impact assessment emerge from the statistical analysis.

Result 1: U.S. regulatory impact analyses are of higher quality on average than European impact assessments, although both are of low quality.

The quality of economic analyses, as measured by the scorecards, is different for the U.S. and the European economic analyses. Table 1 summarizes the overall percentage of economic analyses that included the scorecard item for the U.S. and the European data. In almost all of the scorecard items, the average percentage of complying analyses is lower for the European IAs than the U.S. RIAs—and in many cases substantially lower. For example, 74 percent of RIAs specified a discount rate, while only 2 percent of the IAs did. Seventy-seven percent of the RIAs, included an executive summary, but just 17 percent of IAs included one. Eighty-eight percent of RIAs quantified at least some benefits, while just 35 percent of IAs did so. Only 40 percent of IAs quantified at least some costs, while all of the RIAs included full cost information. This pattern is revealing and consistent with other evidence that the quality of IAs, as measured by scorecards, is low (Opoku and Jordan, 2004; Vibert, 2004; Lussis, 2004; IMV, 2006).

[17] These correspond to items 9, 21, and 33. See Table 1.
[18] Normalization means that an IA that includes all the scorecard items in the index receives a score of 1 for that index. For example, for Index 2, the possible values are 0 (0 out of 3), 0.33 (1 out of 3), 0.67 (2 out of 3), and 1 (3 out of 3).
[19] The IA labeled SEC(2004)924 corresponds to two proposals, COM(2004)492 and COM(2004)493. We have counted it only once.
[20] Some IAs were associated with more than one instrument.

Statistically, we find that the overall quality scores are significantly lower for the European impact assessments. The hypothesis of equal means for both indices between the European IAs and the U.S. RIAs can be rejected at the 1% significance level.[21]

The results demonstrate that the average scores on both indices are significantly lower for IAs than for RIAs. The mean score on Index 1 is 0.32 (about five out of 16 scorecard items) for the European IA dataset, with a variance of 0.05. The U.S. economic analyses perform better; the mean score on Index 1 is 0.71 (about 11 out of 16 scorecard items), with a variance of 0.05. The scores for Index 2 are poorer for both the U.S. and the European economic analyses. The mean score for the IAs is 0.20, with a variance of 0.11, while the mean score for the RIAs is 0.64, with a variance of 0.07.

A high percentage of both European and U.S. economic analyses included some information on costs, benefits, and alternatives. Both recognized that costs and benefits exist in almost all analyses (100 percent of RIAs stated that costs exist and 95 percent stated benefits exist, while 76 percent of IAs stated costs exist and 91 percent stated benefits exist). A high percentage of RIAs and IAs considered at least one alternative (80 percent of RIAs and 85 percent of IAs). In addition, the European IAs did fairly well on specific European impact assessment characteristics such as assessing environmental and social impacts, reporting a consultation, and considering subsidiarity and proportionality. Table 2 summarizes these results.

Result 2: European IAs have gotten worse from 2003 to mid-2005.

Renda (2006) first observed that European IAs are getting worse based on a graphical illustration of individual questions over time. We confirm this observation using statistical analysis. We run a logistical (logit) regression and an ordinary least squares (OLS) regression on the European IAs, summarized in Table 3. The dependent variable for the logit regression is *score*, a dummy variable equal to 1 if the impact assessment contains the scorecard item and 0 otherwise. This variable is run on several independent variables. The independent variables include a linear time trend, a dummy indicating whether the IA was done on a proposal, dummies for the type of initiative (regulation, decision, directive, or communication), dummies

[21] A mean comparison test showed that the hypothesis of equal means could be rejected at the 1% significance level. A Levene test of equal variances showed that the hypothesis of equal variances could not be rejected.

for the two most common lead departments, and dummies for each of the items considered.[22] This follows the approach used by Hahn and Dudley (2007) for the U.S. economic analyses.[23]

The OLS regressions are run on two continuous dependent variables, Index 1 and Index 2. The independent variables exclude the specific item dummies because these data are organized by economic analyses and are not pooled by scorecard item.

Table 3 shows the results for the European IAs. The time trend is significantly negative in the logit and OLS specifications in the European data, implying that an IA scored in 2005 is less likely to include a scorecard item than is an IA scored in 2003. That is, the analysis suggests that the European IAs have been getting worse from 2003 to mid-2005.[24] According to the OLS regression, the magnitude of the impact on Index 1 is that IAs include about one item of interest less each year. Hahn and Dudley (2007) did not find a robustly significant time trend for the U.S. RIAs.

Result 3: Controlling for proportionate analysis does not appear to explain the low scores.

Figure 1a shows the distribution of different scores on Index 1 for the European IAs. Low scores are common, and high scores are rare. For the U.S. RIAs, the opposite is true, with high scores being the most common, summarized in Figure 1b. In the European Union, however, the principle of proportionate analysis is supposed to guide resource allocation for analysis.[25] An IA prepared for a nonbinding, broad policy-defining initiative might be of lower quality and exclude important economic information that would require greater resources to collect. It may not be reasonable to group these IAs with IAs that are supposed to be detailed analyses of new regulatory proposals. Ideally, we would like to know the level of resources devoted to different

[22] Because this method pools all of the scorecard items, we use robust standard errors to take into account that items are not completely independent of each other and may be clustered by IA.

[23] The independent variables in Hahn and Dudley (2007) included a linear time trend, dummies for the presidential administration under which the impact assessment was done, the logarithm of cost to control for size of the regulation, dummies for the offices of the EPA, and dummies for each of the questions considered. Since many European IAs do not include a best estimate of total costs, we could not use a cost variable in our specifications.

[24] If the principle of proportionate analysis is followed perfectly, this might mean that there was a significantly increasing proportion of low impact proposals in the EU over this time period. We do not think this is likely. See the discussion of Result 3.

[25] IAs are sometimes required of initiatives that look more like bills passed in the U.S. Congress, which are not subject to economic analysis. Scholars have debated whether RIAs performed for minor regulations are of lower quality, but there is no definitive evidence. Hahn and Dudley (2007) find some evidence that RIA quality increases with the cost of the regulation, at least among major regulations. This result was not robust to alternate specifications.

IAs and whether a full cost-benefit analysis was supposed to be done. Unfortunately, the EU does not give specific guidelines as to the level of detail each IA should have.

One objective way to separate the data is to examine nonbinding and binding initiatives under the assumption that this separation might be a reasonable proxy for proportionality since nonbinding initiatives are likely to have lower impact than are binding initiatives. The logit and OLS results summarized in Table 3 support this assertion, suggesting that IAs done for decisions, directives, and regulations, which are binding, are typically of higher quality than are IAs done for communications, which are nonbinding. We can compare the effect of different initiatives on the probability that an IA includes an item using the logit regression results. For example, we calculate that a binding directive headed by DG Environment (ENV) has a 77 percent chance of providing a point or range estimate of total cost while a nonbinding communication headed by the same department has a 55 percent chance of providing a point or range estimate of total cost.[26] The logit results show that nonbinding IAs are less likely to include scorecard items. In fact, the mean score on both indices is higher for binding initiatives than for nonbinding initiatives, though this result is only significant for Index 2.[27]

This analysis demonstrates that the principle of proportionate analysis may explain some of the "poor" scorecard results. The higher scores of binding initiatives, however, seem to be largely driven by the higher scores associated with directives. In fact, on Index 1, regulations have a lower mean score than communications.[28] For directives, the mean score on Index 1 and Index 2 is 0.41 and 0.30, respectively. The corresponding mean scores for decisions are 0.38 and 0.28. Regulations do worse, with mean scores of 0.26 and 0.20, respectively. For communications, the mean scores are 0.29 and 0.13, respectively. A mean comparison test of communications versus the other initiatives separately shows that the hypothesis of equal means could only be rejected for directives and communications on Index 1 and Index 2 and for decisions and communications on Index 2.[29] This means that whether the initiative is binding is an imperfect proxy for the principle, if we assume that it is being applied correctly.

[26] The results summarized are for Index 1, which corresponds to regression (1).
[27] The result is significant at the 10% level.
[28] This result is not significant.
[29] Between directives and communications, the hypothesis is rejected at the 5% level for Index 1 and at the 10% for Index 2. Between decisions and communications, the hypothesis is rejected at the 10% for Index 2. The hypothesis of equal means could not be rejected for regulations versus communications for either Index.

Nevertheless, even when we compare the U.S. RIAs to only IAs on directives, the European economic analyses still fall short. Figure 2 summarizes the distribution of scores on Index 1 for directives only. The mean increases, but this is due to a few good IAs; most still have low scores. European impact assessments also fall short when compared to the U.S. data on the most basic index, Index 2, which consists of the three items that are arguably the most important.[30] If proportionate analysis explains the differences perfectly, then less than eight percent of European IAs completed between 2003 and mid-2005 were significant enough to warrant a point or range estimate of total costs, benefits, and net benefits. Even more unlikely, the proportionate principle would have to justify why almost 70 percent of the initiatives had no information on total costs and benefits. In contrast, almost 30 percent of RIAs in the U.S. included a point or range estimate of costs, benefits, and net benefits, and only one percent did not include any information on total costs and benefits. We believe this strongly suggests that there is much room for the European Union to improve its impact assessment in order to facilitate decision making.

VI. Conclusions and Recommendations for Future Research

The statistical analysis of European IAs reveals that they provide little useful quantitative economic information and that they may have gotten less informative from 2003 to mid-2005. The principle of proportionate analysis may help explain these results, but there appears to be a deeper problem.

One explanation for the low European scores is that the European Union does not have the equivalent of an executive order explicitly requiring that benefits justify costs.[31] In 2005, the European Commission updated the guidelines for impact assessment, requiring an executive summary, recommending a discount rate, and including guidance on specific and operational

[30] Index 2 consists of only three items: did the economic analysis include a point or range estimate of costs; did the economic analysis include a point or range estimate of benefits; and did the economic analysis calculate net benefits or cost effectiveness. See Table 1.

[31] Another reason could be that U.S. environmental RIAs may not be representative of the quality of all U.S. RIAs. European IAs poor performance may be more similar or even better than some types of U.S. non-environmental RIAs. Though this is a possibility, it is unlikely. Hahn *et al.* (2000) looked at cross-agency differences and did not find them to be substantial.

objectives (EC, 2005).[32] Future research can assess whether the updated guidelines or the experience with the system had an effect on the quality of European IAs.

We believe that the resources expended on an analysis should be related to the likely value of that information. It would be useful for the Commission to issue more precise guidance on this issue. The 2005 updated guidelines state that certain types of initiatives, such as new regulatory proposals, will require an analysis that is more developed than will others (EC, 2005). We believe that the EU can be more precise, stating expectations for analysis of different types of initiatives or levels of impacts. We recommend that the EU explicitly require that more economically significant initiatives receive higher levels of scrutiny, as is currently done in the U.S. for proposed regulations. This requirement would make it easier to identify analyses that fell short of expectations, thus creating a mechanism for holding the EU more accountable.

U.S. decision makers may also have something to learn from European requirement for analysis. The range of initiatives that are supposed to be scrutinized carefully in Europe is much broader. Perhaps it is time that the U.S. expand the reach of economic analysis to laws that give rise to regulation, for example.[33] If it does so, it should keep in mind the value of information problem and set analytical standards accordingly.

[32] At least one analyst has suggested that IA quality may follow a U-shape curve over time (Jacobs, 2006). Jacobs suggests that the initial expansion of analysis leads to a decline in quality, but that training and experience eventually catches up and quality rises again.

[33] OMB (2006) considers the differences in scope between European IAs and U.S. RIAs, but does not conclude that the U.S. should increase its scope.

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Table 1: Scorecard Items and Summary Statistics

Item	Category and Item Description	Percent of European IAs that Include Scorecard Item (n=94)	Percent of U.S. RIAs that Include Scorecard Item (n=74)
	Estimation of Costs		
1	Stated costs exist	76%	100%
2	Quantified at least some costs	40%	100%
3	Monetized at least some costs	38%	100%
4	Provided point estimate of total cost	19%	65%
5	Provided range for total costs	10%	34%
6	Associate costs w/EU institutions (Federal Govt)	23%	30%
7	Associate costs/non-EU institutions (non-Federal Govt)	9%	39%
8	Associate costs with producers	13%	96%
9	Provided point estimate or range of total costs	26%	88%
10	Provided point estimate and range for total costs	2%	11%
	Estimation of Benefits		
11	Stated benefits exists	91%	95%
12	Quantified at least some benefits	34%	88%
13	Monetized at least some benefits	27%	51%
14	Provided point estimate of total benefits	10%	22%
15	Provided range for total benefits	3%	26%
16	Monetized safety benefits	3%	3%
17	Monetized health benefits	3%	15%
18	Monetized pollution reduction benefits (not health related)	6%	27%
19	Monetized pollution reduction benefits (health related)	3%	30%
20	Monetized any health-related benefit	6%	32%
21	Provided point estimate or range of total benefits	13%	38%
22	Provided point estimate and range for total benefits	1%	9%
	Comparison of Costs and Benefits		
23	Calculated net benefits	14%	31%
24	Provided a point estimate of net benefits	10%	12%

Item	Category and Item Description	Percent of European IAs that Include Scorecard Item (n=94)	Percent of U.S. RIAs that Include Scorecard Item (n=74)
25	Provided a range for net benefits	4%	20%
26	Calculated a point estimate or range for net benefits	14%	27%
27	Calculated a point estimate and range for net benefits	0%	5%
28	Had positive net benefits	21%	27%
29	Calculated cost effectiveness	9%	50%
30	Provided a point estimate of cost effectiveness	6%	36%
31	Provided a range for cost effectiveness	1%	11%
32	Provided a point estimate or range for total cost effectiveness	6%	42%
33	Calculated net benefits or cost effectiveness	21%	68%
34	Calculated net benefits and cost effectiveness	1%	14%
	Evaluation of Alternatives		
35	Considered at least one alternative	85%	80%
36	Gave at least one alternative standard level	3%	66%
37	Quantified alternatives (costs)	17%	66%
38	Monetized alternatives (costs)	15%	66%
39	Quantified alternatives (benefits)	12%	51%
40	Monetized alternative (benefits)	7%	32%
41	Cost effectiveness of alternatives	6%	27%
42	Net benefits of alternatives	9%	27%
43	Net benefits or cost effectiveness of alternatives	13%	46%
	Clarity of Presentation: Executive Summary		
44	Contain executive summary (ES)	17%	77%
45	ES contains tables	5%	59%
46	ES present at least some monetized costs	2%	73%
47	ES present at least some monetized benefits	3%	45%
48	ES present any measure of cost effectiveness	0%	28%
49	ES present any estimate of net	2%	31%

Item	Category and Item Description	Percent of European IAs that Include Scorecard Item (n=94)	Percent of U.S. RIAs that Include Scorecard Item (n=74)
	benefits		
50	ES offer a point judgment of how benefits and costs compare	2%	30%
51	ES summarize any non-quantified benefits	11%	53%
52	ES summarize any non-quantified costs	2%	30%
	Consistent Use of Analytical Assumptions		
53	Identified Euro year (dollar)	2%	73%
54	Used consistent euro year (dollar year)	2%	68%
55	Identified discount rate	2%	74%
56	Used consistent discount rate	1%	68%
57	Identified and consistently used discount rate and euro year (dollar year)	1%	49%
Index 1	Items 1-3, 9, 11-13, 21, 33, 35, 37-40, 43, 53	32%	71%
Index 2	Items 9, 21, 33	20%	64%

Note: Data from Renda (2006) and Hahn and Dudley (2007).

Table 2: Specific Questions for European Impact Assessment

Item	Category and Item Description	Percent of U.S. RIAs that Include Scorecard Item (n=74)
58	Environmental impact assessed	60%
59	Social impact assessed	76%
60	Administrative burdens assessed	22%
61	CBA, CEA, risk-risk analysis	18%
62	Consultation reported	90%
63	Consultation led to changes	54%
64	Data from affected interests	29%
65	Provision for review	62%
66	Zero option considered	80%
67	Considered proportionality	56%
68	Sensitivity test	5%

Note: Data from Renda (2006). CBA refers to cost-benefit analysis and CEA refers to cost-effectiveness analysis. The zero option is the baseline status quo scenario.

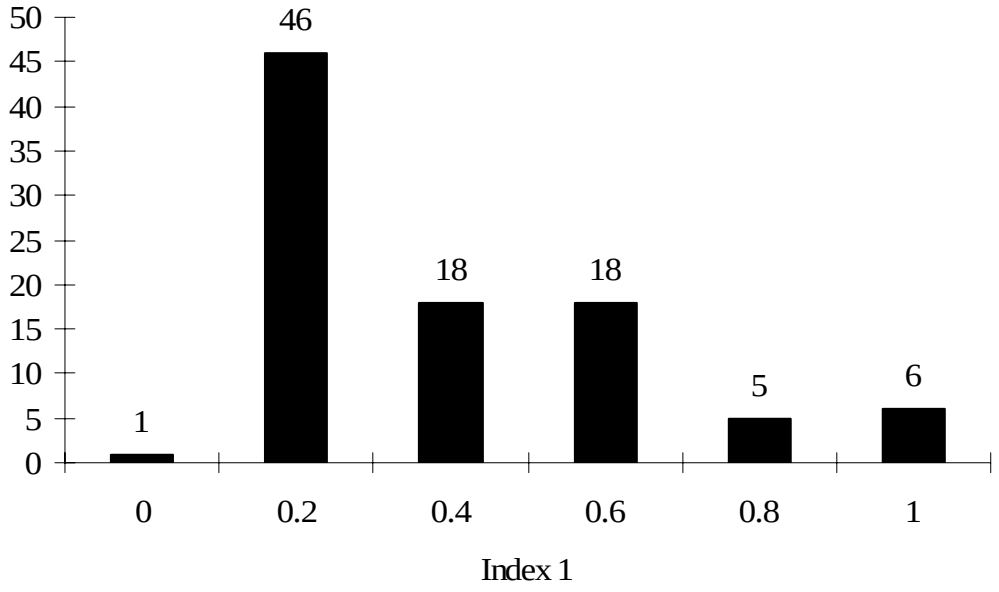
Table 3: Logit and OLS Estimations for Quality of EU Impact Assessment

	(1)	(2)	(3)	(4)
Dependent variable	Score	Index 1	Score	Index 2
Items included	Index 1 items		Index 2 items	
Statistical Analysis	Logit	OLS	Logit	OLS
Independent variables (below)				
Linear time trend	-0.564	-0.068	-0.762	-0.092
	(2.36)*	(1.98)+	(2.49)*	(1.86)+
Proposal dummy	-0.219	-0.035	-0.146	-0.039
	(0.67)	(0.79)	(0.27)	(0.51)
Regulation dummy	1.311	0.189	3.257	0.485
	(2.14)*	(1.92)+	(3.38)**	(2.97)**
Decision dummy	2.445	0.337	3.936	0.581
	(4.44)**	(3.81)**	(4.00)**	(3.80)**
Directive dummy	1.971	0.285	3.201	0.501
	(3.98)**	(3.14)**	(3.50)**	(3.21)**
Communication dummy	1.435	0.197	2.665	0.403
	(2.03)*	(1.83)+	(2.31)*	(2.29)*
ENV is the lead DG	1.210	0.167	0.912	0.131
	(2.61)**	(2.50)*	(1.29)	(1.12)
JLS is the lead DG	-0.354	-0.050	-0.695	-0.076
	(0.76)	(0.89)	(0.75)	(0.96)
Constant	-5.293	0.209	-3.207	-0.094
	(4.99)**	(1.82)+	(3.06)**	(0.50)
Observations	1786	94	282	94
R-squared		0.29		0.23

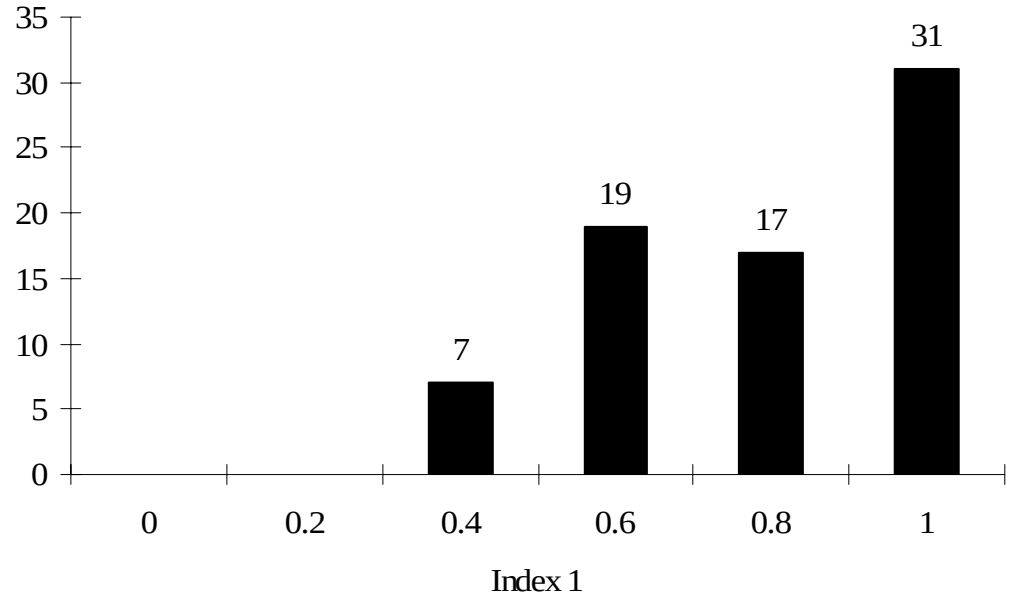
Regressions (1) and (3) have dummies for all the scorecard items included in the respective indices, which I do not summarize. The number of observations reflects the organization of the data; the OLS data is organized by IA, while the logit data is organized by the items in the index. Robust standard errors were used (adjusted for the 94 clusters by IA in the logit specifications) and robust z statistics/t statistics in parenthesis. + significant at 10%; * significant at 5%; ** significant at 1%.

Figure 1a-1b: The Distribution of Scores on Index 1 for the EU IAs and the U.S. RIAs[34]

1a: EU IAs (n=94)



1b: U.S. RIAs (n=74)



[34] Scores were grouped for simplicity. For example, scores that were greater than 0.8 were grouped under 1, scores that were greater than 0.6 up until 0.8 were grouped under 0.8, scores that were greater than 0.4 up until 0.6 were grouped under 0.6, and so on.

Figure 2: The Distribution of Scores on Index 1 for EU Directive IAs (n=23)

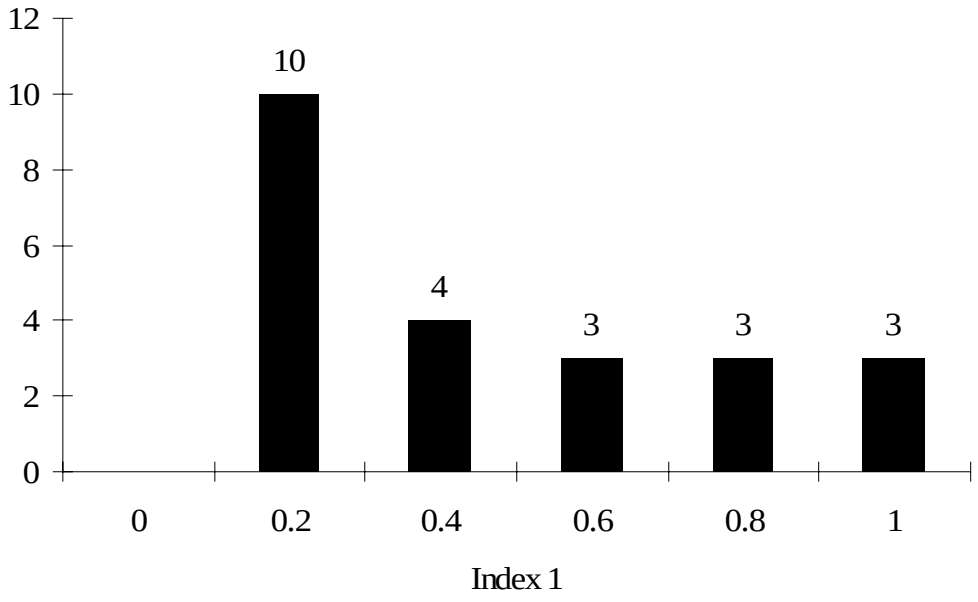
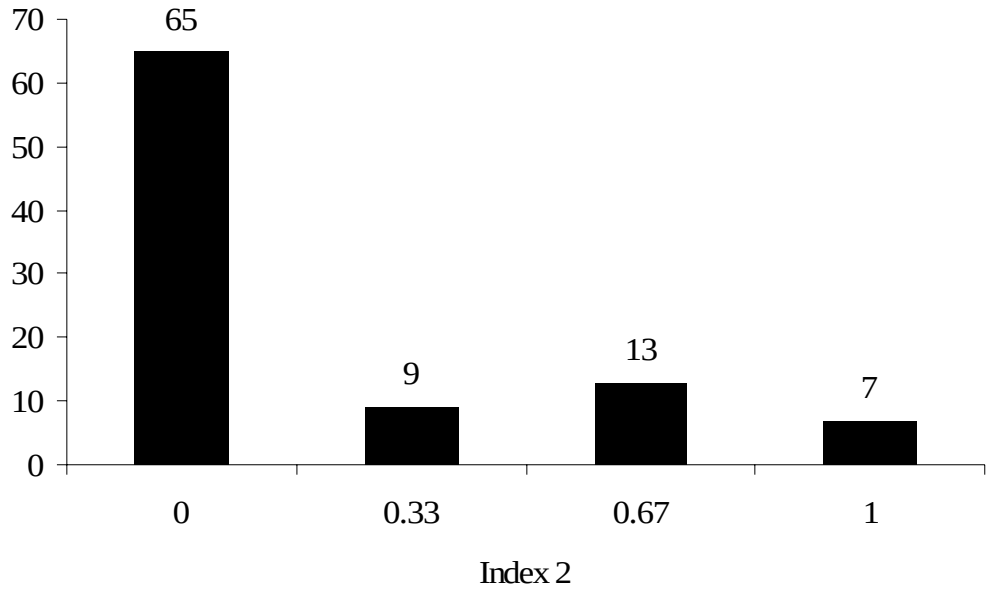


Figure 3a-3b: The Distribution of Scores on Index 2 for the EU IAs and the U.S. RIAs

3a: EU IAs (n=94)



3b: U.S. RIAs (n=74)