

Data Collection for Cost Estimation in Regulatory Impact Analysis

Working Paper

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Abstract

RIA as a tool for better regulation is expanding rapidly in the European Commission and among European Member States. Many countries have published RIA-guidance and offer training for civil servants performing RIA. Most guidelines stress the importance of a sound methodology and the desirability of quantification of costs and benefits. More detailed RIA guidance often discusses valuation techniques, data collection strategies and other approaches to derive cost and benefit estimates.

Since 2003, there have been a range of recent evaluation exercises of RIAs, in the European Commission as well as in Member States. They point to some common problems associated with RIA, such as non-availability of data, difficulties in quantification, and lack of skills or resources to comply with the RIA quantification requirements. Not surprisingly, many RIAs seem to fall short on quantified and monetized data. Even in countries and regions where RIA has been there for many years and a lot of emphasis is put on quantification, like the US and the UK, it is repeatedly reported that the costs (and where relevant the benefits) have not of not accurately been quantified and assessed.

Regulatory units within governments or administrations often recognise these points. But they seem to think that, at this stage in the development of RIA, there are other aspects of the assessment process whose improvement might add more value, and might therefore merit higher priority in the immediate future than quantification.

While this may be true, we believe that the problem of insufficient quantification in RIAs remains very important. The investment in getting better costs estimates moreover seems often small relative to the potential efficiencies provided by better quality cost estimates.

The purpose of this working paper is therefore to explore the type of data that is considered necessary or desirable in performing a good RIA (demand side) as well as the range of techniques and data sources that are being used in RIAs (supply side). We mainly focus on quantification of costs for business and the economy. In the next phase of the research project, we will look for opportunities to narrow the current gap between demand and supply. Our overall aim is to contribute to lower data collection costs, in order to shift the balance in decisions about how extensive the RIA analysis should be (cf. the notion of proportionate analysis) towards more comprehensive assessments, and therefore higher quality RIAs and ultimately better regulation.

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1. Introduction

Since 2002 major policy proposals of the European Commission are subject to an impact assessment procedure (RIA). This is a requirement to conduct an ex-ante assessment of costs and benefits of a proposed measure. Covering economic, environmental and social impacts, in an integrated and balanced manner, the procedure was established as a direct response to calls for regulatory and sustainable Impact Assessment tools in the conclusions of the Laeken and Göteborg European Councils. The Commission's new Impact Assessment procedure cuts across all sectors and has integrated and replaced all previous single-sector type Impact Assessments (business, gender, environmental, health, etc.).

A RIA considers a range of impacts of a proposed policy by reference to both a 'counter-factual' option (often described as the do nothing option) and alternative policy options. In addition to its contribution to increased transparency in the regulatory process, IA contributes to better documented proposals. RIA is intended, above all, to help improve the quality of regulatory proposals and identify balanced solutions. RIA is an aid to the regulatory process, but not a substitute for political judgement.

RIA as a tool for better regulation is expanding rapidly among European Member States as well. Some countries like the UK have a long standing tradition in RIA, while others are just starting. In the Flanders region in Belgium for example, a requirement to perform regulatory impact analysis for all regulatory proposals of government was introduced from 1 January 2005 onwards. It has been developed after examining established RIA-procedures in OECD countries. As such, the the Flemish system aims to combine the best features of Impact Assessment systems in use elsewhere. The European Commission supports this trend, and has repeatedly invited Member States to complement the European Impact Assessment by equivalent practices in the Member States with respect to their own legislation and their shares of input into the Community's legislative decision making process.

Many countries have published RIA-guidance and offer training for civil servants performing RIA. Most guidelines on RIA put great emphasis on RIA as a structured process of assessment and dialogue between government departments as well as with stakeholders. But on the other hand they also stress the importance of a sound methodology and the desirability of quantification of costs and benefits, stating that the credibility of a RIA depends to a large extent on providing results that are based on reliable data and robust analysis, and which are transparent and understandable to non-specialists. They therefore often stress that costs and benefits should be quantified wherever possible, preferably in monetary terms. The UK guidance explains why: "Expressing impacts in monetary terms – even where they do not have explicit market values – allows different impacts to be compared more easily, helping decision makers choose between options. In the absence of monetisation, other forms of quantification should be used where possible – eg number of lives saved, changes in emission levels etc. Only if neither monetization nor quantification is possible, a simple indication of the main categories of costs and benefits could be made". This cascade reflects the ambition in the more rigorous RIA systems to use the cost-benefit principle en when possible even cost-benefit analysis as the theoretical background for RIA.

Guidance material therefore usually mentions that a good qualitative analysis is a minimum. To complement the qualitative assessment, quantification and/or monetisation must be strived for where possible and appropriate. This reflects that the quantification of costs and benefits should be proportionate to the likely impact. And to be clear, establishing ranges, orders of magnitudes, and rough estimates is considered more important for the purpose of RIA than any expectation of precision. In RIA, decisions are not made on strict comparisons of total monetised costs and total monetised benefits, but 'facts and figures' are nevertheless

very important to gain a more accurate insight in the problems and solutions at hand. Trying to do a quantified analysis can lead to useful information even if one cannot arrive at precise figures.

More detailed RIA guidance furthermore discusses valuation techniques, data collection strategies and other approaches to derive cost and benefit estimates. There is however a consensus that there is no one single best approach. RIA guidance often explicitly permits flexibility to ensure that all significant positive and negative effects are taken into account, depending on the context, resources and time available. This flexibility is sometimes accompanied by a set of good practices. They typically include that:

- Costs and benefits should be assessed with respect to each interested party, clearly distinguishing among business, households and public administrations.
- Costs and benefits should always be assessed compared to a baseline (for instance, the status quo).
- A common unit of measurement should be used when possible to facilitate the comparison of different effects.
- In the event that costs and benefits are discounted, it should be clearly declared what the discount rate used is. This rate should be the same across different options.
- At least when dealing with health, safety and the environment, a quantitative risk assessment should be carried out.
- All the hypothesis or assumptions used to carry out impact assessment should be clearly explained and the sources of information should always be specified.

Since the start of the EU Impact Assessment process in early 2003, more than 50 extended Impact Assessments of proposals have been completed by several different DGs or services. The European Commission recently performed an evaluation of the experience so far. In addition, there has been a range of recent evaluation exercises of RIAs in Member States as well. They point to some common problems associated with RIA, such as:

- Non-availability of data
- Difficulties in quantification of intangible benefits
- Difficulties in assessment of indirect effects
- Lack of skills or resources to comply with the RIA requirements
- Inadequate selection and assessment of options
- Lack of transparency and consultation in the RIA process
- Political and bureaucratic interference
- Lack of quality control of the RIAs which are performed
- RIAs are often undertaken at later stages of the decision-making process.

Looking deeper into the issue of quantification, many RIAs seem to fall short on quantified and monetized data. Even in countries and regions where RIA has been there for many years and where a lot of emphasis is put on quantification, like the US and the UK, it is repeatedly reported that costs (and where relevant the benefits) have not or not accurately been quantified and assessed. For example, recent work in the USA reveals that, even when the government sets out high standards for RIAs, regulators often fail to comply with them. An evaluation of 48 recent RIAs conducted in the USA between mid 1996 and mid 1999 in the area of health, safety and environment concludes that typically they do not provide enough information to make decisions that will maximise efficiency or effectiveness. For example, less than a third quantified net benefits, and only a third quantified the costs and benefits of alternative options. In the UK, the National Audit Office in March 2005 found that eight of ten RIAs sampled included some quantified estimates of costs, but they were not always accurate or dealing with the most important effects. In other countries, the situation is even worse. A report from the EU Directors of Better Regulation (2004) reveals that in EU-Member States, there is usually an ambition to quantify effects, but in practice important data gaps exist and qualitative descriptions of costs and benefits prevail. It seems that a full and proper

cost-benefit analysis is only seldom carried out (sometimes in UK and Denmark). In some countries quantification is generally limited to or focused on specific impacts (e.g. Sweden for small businesses' compliance costs, the Netherlands and Flanders for administrative burdens ...).

But overall it is recorded that in many cases, quantification was not considered feasible because there were not enough reliable quantified data, quantifiable indicators and impacts. RIAs are moreover often based on relatively 'rough and ready' analysis to a much greater extent than on formal analytic techniques drawn from textbooks. The evaluation technique used varies on a case-by-case basis, and it is often related both to the sector considered and to the relevant constraints (time, resources, skills, data availability). The European Commission concluded, for its Impact Assessments, that continued efforts should be made to improve Impact Assessments through, among other "improved quantification and a possible further monetisation of impacts"; "improved guidance on estimating administrative requirements", "enhanced capacity and skills to carry out impact assessment" and "a more systematic consultation of available European statistical data".

	AUT	BEL (FL)	DEN	FIN	GER	HUN	IT	NL	POL	SW	UK
The effects are represented:											
a) In qualitative terms only											
b) Mainly in qualitative terms			Y		Y	Y					
c) Both in qualitative and quantitative terms		Y		Y			Y	Y	Y	Y	Y
d) Mainly in quantitative terms	Y										
Which evaluation technique is used:											
i) full and proper CBA			Y								
ii) assessment of the main costs and benefits		Y	Y	Y			Y	Y	Y		Y
iii) cost-effectiveness analysis	Y		Y		Y		Y				
iv) multicriteria											
v) risk analysis			Y								
vi) simple check-list			Y	Y	Y			Y			
vii) others					Y	Y				Y	
Is there a requirement that new regulatory measures shall be justified on the basis of a "cost-benefit principle" according to which it must be shown that their expected benefits exceed the expected costs?	N		N	N	N	N	N	(Y)	Y	N	Y

EU Directors of Better Regulation Group (2004)

Why do RIAs often fall short on quantified costs and benefits? There are many reasons why there are difficulties in quantifying effects:

- Lack of data. There may be difficulties in collecting appropriate data. Some industries and markets are easier to survey and to obtain data from than are others. Data needed for rigorous cost assessment is often commercially sensitive information. Beyond the initial markets (and thus the industries impacted), it is often difficult to calculate further economic impacts in the supply chain.
- Consultation. For RIA to be effective, stakeholders must be involved in data gathering and analysis. There are, in some cases, problems in ensuring that new consultation processes are established when new RIA requirements are put in place.
- Time Requirements: Good RIAs require policymakers to allocate time in the decision-making process to gathering data, undertaking analyses, and discussing analytical outcomes with stakeholders. Many regulators consider that Regulatory Impact Analysis delays decision-making and inhibits the ability of policy-makers to respond to urgent problems or the demands of citizens.

- **Skills and Resources:** Good quality RIAs require adequate skills and resources. Many regulators find it difficult to carry out high quality RIAs because they feel methodologies are complex, they do not have the skills or because they lack resources. When this is the case, quantification of effects can easily be misleading or pointing in a wrong direction due to an inadequate separation of social costs, private costs and transfers, double counting, comparison of 'apples' and 'oranges', etc.
- **Political Resistance:** Regulators sometimes resist to more transparency because they undermine their status as 'expert' decision-makers and reduce their ability to formulate public policy independently. They also fear that analytical requirements will slow down the decision-making process and lead to 'policy paralysis'.
- **Cultural Resistance.** Most business organisations support the need for a careful quantification of effects. But special interest groups who benefit from less empirical decision-making processes tend to resist the changes necessary to implement an effective RIA system. Also, many NGOs fear that RIA will place an excessive emphasis on the quantification of costs and benefits and oppose to monetization of non-market goods.
- **Asymmetric information and regulatory capture.** Ex ante assessments heavily often dependent on businesses to provide data, that as a result are difficult to validate. This leads to risks of bias in cost data (collection) since industry may overstate its true compliance cost in order to limit regulatory stringency. Sometimes data collection is also hampered by the possibility of regulatory capture by businesses, who can use their engagement with the evaluation to influence the outcome beyond the provision of data.
- **Technical Difficulties.** Analytical methods are not always well developed (e.g. the evaluation of the impact of regulations on innovation or on SMEs). There are disagreements about important technical issues (e.g. social discount rates). There are also difficulties in valuing "qualitative" factors and even in estimating resource costs. For example, from business perspective it is often difficult to single out compliance costs for a particular piece of legislation and there may be informational asymmetry between regulators and business.
- **Feasibility.** In some circumstances, quantification of impacts is less feasible, such as where the policy proposal is more strategic in nature rather than technical. Assessments are also more feasible in for example technical environmental protection, and less in the case of nature conservation. In these cases, RIAs usually suffice by describing the magnitude, incidence and nature of significant costs and benefits, rather than attempt to convert all those impacts into monetary values.
- **Adverse learning effects.** If there is significant uncertainty about the numbers, these then become the focus of the debate, rather than the regulatory change itself. Regulators then might be less motivated to provide numbers the next time they prepare a RIA.

As the above discussion implies, the general methodology of conducting RIA is relatively straightforward but the difficulty of performing a good RIA in a specific real world case is considerable. Carrying out RIAs with sufficient depth and quality often requires substantial data, skills and resources. Data collection in itself is recognised as a central element in impact assessment, but also a difficult and resource-intensive one.

Regulatory units often recognise these points. But they are not convinced that re-allocating resources to data collection and quantification, would lead to more effective assessments. To be clear on this point, they are not saying that quantification is unimportant in RIAs (they usually share the general view that a good quantification of effects is a necessary, core requirement of any RIA) but rather that, at this stage in the development of RIA, there are other aspects of the assessment process whose improvement might add more value, and might therefore merit higher priority in the immediate future. These include for example the initial 'definition of the problem' part of the exercise, the appropriate selection of options or the adjustment of the RIA process to ensure that regulators start the RIA process earlier in de

development of a regulation. So at this stage in the development of the RIA, the focus is more on the process of asking the right questions in itself.

While this may be true, we believe that the problem of insufficient quantification in RIAs remains very important. If not now, it will in the near future. We believe that the investment in getting better costs estimates is small relative to the potential efficiencies provided by quality cost estimates. In this respect, there is clearly a need for greater capacity, data collection and courses relating to assessment techniques and cost estimation.

The purpose of this working paper is therefore to explore in more detail the type of information that is considered necessary or desirable for performing a good RIA on the one hand (demand side). On the other hand, we will examine the range of techniques and data sources that can be and/or are being used at present in RIAs (supply side). We will afterwards confront demand and supply and look for opportunities to narrow the existing gap. Our overall aim is to contribute to lower data collection costs, in order to shift the balance in decisions about how extensive the RIA analysis should be (cf. the notion of proportionate analysis) towards more comprehensive assessments, and therefore higher quality RIAs and ultimately better regulation.

Our focus is on quantification of costs for business and the economy. There are several reasons for that.

- A first reason is the fact that the Spring European Council 2004, the Competitiveness Council, the High Level Group on Competitiveness and Growth, and the Economic and Financial Affairs Council have urged the Commission to reflect in greater detail on how competitiveness and issues related to administrative burden may be considered in the Impact Assessment method. Following the Council's calls for better assessment of competitiveness impacts, the list of economic impacts to be considered has been refocused to give greater attention to factors that are widely considered to be important to productivity and hence to the competitiveness of the EU. This list also includes a new section on administrative requirements for which clearer guidance is being drafted in a separate document. Research projects are also underway to develop further tools in support of Impact Assessment.
- A second reason is that compliance cost reduction is important. Compliance costs can discourage (productivity) growth and employment by diverting the energies and resources of firms from more productive uses¹, be passed on to consumers through higher prices, with possible distributional and equity consequences, erode international competitiveness where overseas firms face lower compliance costs, and discourage compliance. This harms the working relationship between business and government, and gives those who don't comply a competitive advantage over those who do. It can also undermine the achievement of the policy objective. Because compliance costs can act as a brake on business achievement, they can have a real impact on the government's key social and economic objectives. The benefits of reducing costs include stronger enterprises, higher growth and higher employment levels.
- Thirdly, cost calculation is, more than benefit estimation, a problem area popular with academics and consultants, and there is an obvious attraction in 'contracting out' these parts of the assessment. Sub-contracting parts of the RIA exercise is often considered a potentially useful way forward in relation to the quantitative assessment of impacts, because of the extra skills and know-how it can bring to the assessment².

¹ Compliance costs divert private resources to public purposes, where the costs of such government requirements amount in effect to a regulatory tax; with similar economic effects as explicit (fiscal) taxation. Studies have estimated direct compliance costs at between 4%-12% of GDP (OECD, 1997).

² It should be stressed, however, that there are dangers in the sub-contracting to consultants of the *entire* RIA. It is very easy for external reports to produce spurious precision in quantification, and it can be very difficult for policymakers to 'get behind', and to understand the implications of, the array of assumptions that are almost invariably made in this type of work. More importantly, it easily disengages public officials, to a greater or lesser

In the following parts of this working paper, we first revisit the basic steps in assessing economic impacts of a policy proposal in a RIA. We then give a list of typologies of what is meant in RIAs by costs and economic effects. Together, they make out the demand side of our equation. The next chapter explores the techniques that are being proposed and used to quantify effects, as well as the available data sources. It makes out the supply side of our equation. We end up with a research plan that aims to look for opportunities to narrow the existing gap between supply and demand.

2. Key steps in a cost analysis

The basic steps in assessing economic impacts of a policy proposal in a RIA are usually:

1. Baseline
2. Business response
3. Direct impacts
4. Indirect impacts
5. Distributional effects

This part discusses each of these steps briefly. Of course, before we reach the stage of performing a cost analysis of policy options, it is necessary to have identified the policy options that we intend to consider. There are two previous steps required to reach this point. First, one needs to clearly identify the concerning problem and the general policy targets as solutions to that problem. Second, one needs to consider the different possible policy options that might be used to address this problem, so that we can set aside the most promising options for more detailed consideration.

Baseline

A critical step in the assessment of costs of a policy is working out what would happen if the policy was not implemented. This is called developing a baseline, or determining a “business as usual” scenario. The baseline forms the point of departure for assessing the costs of the policy, and also for determining the effects of the policy in environmental terms. A good definition of the baseline case includes a specification of trends for the main variables that will affect the costs of a policy, such as trends in key economic drivers and technological trends. The baseline is essential, as one should then only measure those additional costs that are directly linked with the policy measure. Costs that would have been incurred anyway should be left out.

Business response

Once the baseline and the policy measure(s) have been clearly defined, consideration needs to be given to who exactly will be affected by a policy measure, and in what way. The stakeholders and their interests should be identified early on and listed³. A practical approach is first, to identify the groups affected. The size of each affected group should be indicated, if possible. Secondly, their response to the policy measure needs to be predicted and quantified as far as possible, describing the extent to which compliance requires investment in processes or products, and varies across types of business (eg size, activity) based on planned or supposed responses in terms of the application of certain technologies and techniques. An estimation of the number of new businesses that may be created, and/or

extent, from central aspects of the RIA process. Definition of the problem, specification of objectives, development of options etc. are so close to the policy making process that there could be severe risks to the effectiveness of RIAs if they are simply delegated.

³ It should be remembered though that the focus of a cost analysis is total cost to society as a whole, rather than the effects on any single group.

eliminated, including whether businesses may also be expanded or diminished, as a result of the regulation might in some cases be desirable.

Any analysis should recognise that the population of regulated businesses is not homogenous. As well as variations in size, markets and activity, most regulated populations can be divided into those businesses that employ best practice and will be ahead of even new legislation, where compliance costs are (close to) zero; employ a policy of standard compliance, where adjustment costs may be greatest, employ essentially a non-compliance policy, where compliance costs are limited by the time taken to respond (but where there are significant enforcement costs. These variations will cut across standard economic descriptions of the regulated business population. But it is hard to quantify the impact of these different responses in an ex-ante assessment.

A common procedure for cost analysis

1. Establish a baseline or “business as usual” scenario
2. Identify all the parties affected by a particular measure and predict their response to the policy measure. For example:
 - consumers
 - shareholders
 - government
3. Identify the direct impacts of the policy on each group and for society as a whole
 - additional expenditure incurred
 - capital costs
 - operating costs
 - time costs
 - reduced productivity

Convert cost figures for different points in time into comparable terms, by discounting to obtain a present value, or by converting all figures into annualised costs

Make necessary adjustments to this information on private costs in order to arrive at figures that reflect social costs:

- adjust for transfers of funds between groups (e.g. taxes)
 - adjust for any other gaps between social and private costs
 - make sure that there is no double counting
4. Identify the indirect impacts of the policy
 - behavioural impacts
 - loss or gain of market/output
 - loss or gain of competitiveness
 5. Identify distributional effects
 - between industry (e.g. sectors, SMEs ...)
 - between households
 - between regions

Direct Impacts

The direct impacts are usually conceived in terms of the direct costs to business of compliance with the legislation⁴. This includes both the capital and revenue costs of process or product changes to ensure compliance and the administration costs of demonstrating

⁴ Note we discuss the assessment of the impacts on business. A full impact assessment would also include consideration of the environmental impacts on society.

compliance. The steps described above should help to consider a wide range of possible impacts so that the analysis does not just concentrate on a few core impacts. After the identification of impacts, a second step is a qualitative assessment of which impacts are the most significant. It is important that a sense of proportion is maintained when performing cost analysis. For some policy there is no real need for an extensive analysis because the issue is not sufficiently important to warrant a comprehensive analysis. Significant effort should in a third step be spent in the advanced qualitative and/or quantitative analysis of these impacts when it is considered proportionate to make a further in-depth analysis. A fourth step is to make necessary adjustments to this information on private costs in order to arrive at figures that reflect social costs, such as adjustments for transfers of funds between groups (e.g. taxes, cf. infra) and making sure that there is no double counting⁵.

Indirect Impacts

The impact on business – in terms of loss or gain of market/output, productivity, competitiveness, may also be considered in an Impact Assessment. A useful approach to identifying impacts is to build a causal “model”. This ‘bottom-up’ exercise starts by identifying the impacts that would arise as a result of the policy attaining its set objectives. These initially identified impacts can then form the basis for identifying further rounds of impacts, and so on. A flowchart or map of impacts can then be built that sketches out cause-and-effect linkages between each of the policy options/instruments and their impacts. Quantitative assessment of indirect or “secondary” economic “welfare” effects often requires modelling of the (international) economy, or more “simple” assessments (for example applying the concepts of price- elasticity in order to assess the effects on the output of sectors). This is often a difficult exercise, requiring assumptions about future economic and sectoral developments and prices.

Distributional effects

The principal concern in a cost analysis is estimating the overall level of costs that a policy induces so as to identify cost effective policy options⁶. However, it is also important to be aware that the distribution of costs between industry, consumers and regions (or countries) is also an important influence on decision making for particular policy issues. The most cost effective policy measures may not appear attractive if they imply a very disproportionate burden for some groups or sectors. Therefore attention has to be paid to how costs are distributed across groups, and a cost analysis should be conducted in such a way that this can be determined as far as possible. The approach suggested above allows this type of distributional analysis to be conducted, as it starts at the sectoral or group level and then moves up to derive aggregate costs to society. Additional useful “affordability” indices can be calculated, if necessary, to analyse the burden imposed on a firm or sector by a particular level of costs. This is very often made with reference to other relevant financial information for the sector to give an idea of how significant an effect of the policy will have on a sector by comparing the cost to some other indicator of the size of the sector.

Presentation of results

Results need to be presented in a format that makes their interpretation straightforward. In addition to clear presentation of outputs, it is important to clearly state the key assumptions used to arrive at the results. Here, it may be useful to distinguish the different types of assumptions that need to be made in a particular analysis. For example between assumptions used to fill in data gaps or in extrapolating data and key economic assumptions such as discount rates or growth of energy use. The uncertainties surrounding these assumptions should be made clear, and sensitivity analysis performed if necessary.

⁵ For example, costs that are passed on to consumers as higher prices should not be counted as a cost to both consumers and firms.

⁶ As we are considering public policy, our primary concern should be the total level of costs rather than the costs that arise for a specific sector. If we concerned ourselves only with policy which minimised costs to a specific group we might end up with policy options that were more costly overall.

Sensitivity analysis can also be useful in demonstrating which assumptions are unimportant. This can be useful as it allows attention to be focused on the more critical issues. Data sources should be referenced. The methodology used to calculate key indicators should be described. It is furthermore important to map out any qualifications that the user of a cost analysis should be aware of.

In addition, it is often customary in RIA to mention the key issues relating to compliance costs that are identified in the consultation of stakeholders. This provides a check to ensure that compliance cost issues raised in consultation are addressed. Where suggestions are not able to be implemented or are disputed by officials, departments may indicate the reasons.

3. A taxonomy of costs and economic impacts

Until now, we have used the word costs without further explanation. There is however no uniform concept of 'costs' to business, nor of 'economic impacts' or 'effects'. Below, we discuss different categories of costs and economic effects that are relevant for RIA. We follow as much as possible the definitions that are often used in policy practice, knowing that they divert from standard text book definitions that are being used in cost-benefit analysis.

A basic definition of costs

Economics starts from the assumption that resources are scarce and that it is therefore important that they are used sensibly. By "resources" we mean things such as labour input, capital goods, land and the environment. At the most fundamental level, the economic cost of any policy measure is the value to society of these resources that are used up in order to implement it. This is counted as a cost because the resources that are used up are then not available for other purposes⁷.

Compliance costs

Compliance costs are the additional resources that an affected group or sector has to employ in complying with a policy measure. They include both the administrative burdens and all other compliance costs, such as equipment purchases, retooling, and recurrent production cost. Compliance costs will often show up as increased expenditure. However, there are types of compliance costs that are not necessarily linked to expenditure. For example, a control traffic measure that increases travel time has a direct cost for those travelling. In this case the compliance cost can be converted into money terms by multiplying time lost (in minutes) by an estimate of the money value that people attach to lost travel time⁸. Compliance costs can be distinguished from the government regulatory costs and the wider economic costs of regulation.

Government regulatory costs

Government regulatory costs are incurred by governments to administer and enforce new policies. Government regulatory costs include administration, training, monitoring/reporting, enforcement, litigation, and the cost of developing and distributing permits. If they are significant, they should be estimated separately and added to the private real-resource compliance costs estimates.

Social welfare losses (deadweight losses)

Social welfare losses are less tangible, and relate to the reduction in welfare suffered when a policy induces a change in behaviour⁹. For example, when consumers switch from one

⁷ By using up resources to implement a policy measure we give up the opportunity to use the resources to do something else. For this reason we sometimes say that a policy measure has an 'opportunity cost'.

⁸ This is a very well established procedure in transport economics with a large empirical literature.

⁹ Other terms are sometimes used to describe indirect costs. The term as used here is equivalent to the term "deadweight costs" as used by economists.

product to another that was not originally their first choice because of a policy or a tax. This is because the tax has encouraged them to switch to products that they would not otherwise have chosen. They must therefore be worse off than in the situation before the tax, and the loss of welfare they suffer is the indirect cost of the tax. To estimate indirect costs we need information about how the demand for goods changes with the market price. This information is captured in parameters that are known as “elasticities” of demand. These parameters can be estimated from market data on sales and prices, but in some cases they can be difficult to obtain and a cruder estimate is necessary. In many cases though, the social welfare loss will be rather small in comparison with the compliance costs, and can probably be ignored or estimated very crudely without affecting the overall results of the cost analysis. However, when estimating the costs of economic instruments, bans or restrictions on product use, or other behavioural instruments, then the principal costs of the policy will be mainly welfare losses. For example, a ban on the use of batteries would actually lower expenditure by users of batteries, but could have very significant indirect costs. Indirect costs also must be taken into account whenever a policy measure has a significant effect on tax revenue, as the effects of recycling the revenue may be significant.

Transitional costs

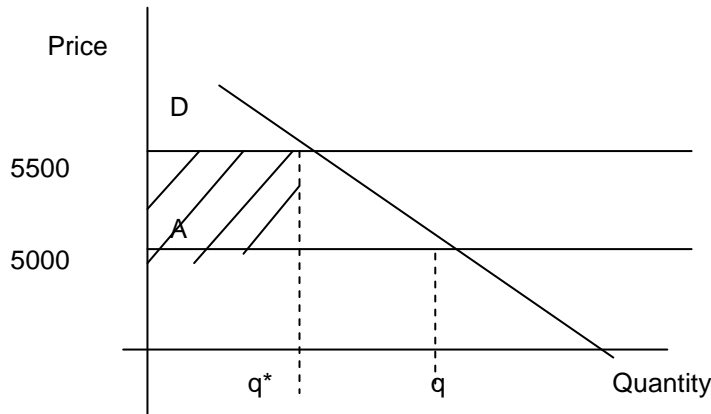
Transitional costs vary depending on the length of the time period examined. Therefore, analyses should be explicit about the time frame being studied. In the short run, the (annualised) private costs of compliance, both for consumers and producers, will be higher relative to the (annualised) long-run costs. This is because the shortrun analysis will not provide for possible adjustments in the production process, or allow consumers to find substitutes. Some workers may become unemployed in the short run, but will find other jobs in the long run. However, over time the impact of a policy can easily spread out to a variety of markets and result in a number of unanticipated adverse effects. Therefore, it is not always appropriate to assume that costs arising in the short run as a consequence of transitional effects will be resolved in the long run. The four transitional effects most frequently considered include: (1) plant closings and resultant unemployment, (2) resources shifting to other markets, (3) transactions costs associated with setting up incentive-based programs, such as with a tradable permits and (4) disruptions in production. In many cases transitional costs are considered to be small enough that their inclusion in the overall cost estimate would not appreciably alter the conclusions. However, when these are expected to be significant, the costs should be estimated.

Wider economic effects

Other possible costs are wider economic impacts that derive from effects on product quality, productivity, innovation, and market structure. Although most individual regulatory policies will not have such dramatic effects, these costs can be quite significant in certain instances, such as when policy's requirements delay industrial projects or affect new product development. Such policy effects are often difficult to measure, but in RIA an effort should be made to at least qualitatively describe these factors when they are considered important. Changes in market structure may occur if the compliance costs are sufficiently high that they drive out enough firms to cause changes in the market concentration and competitiveness of firms remaining in the industry. Such a change often results in shifts of both firm and industry supply curves, which can lead to changes in output and prices in several markets. Labour and capital productivity may decrease under new regulations. Discouraged investment may occur if research and development funds are reallocated to meet additional compliance costs. This may result in decreases in technological innovation and product quality.

Private real resource compliance costs of a policy measure – a graphical exposition

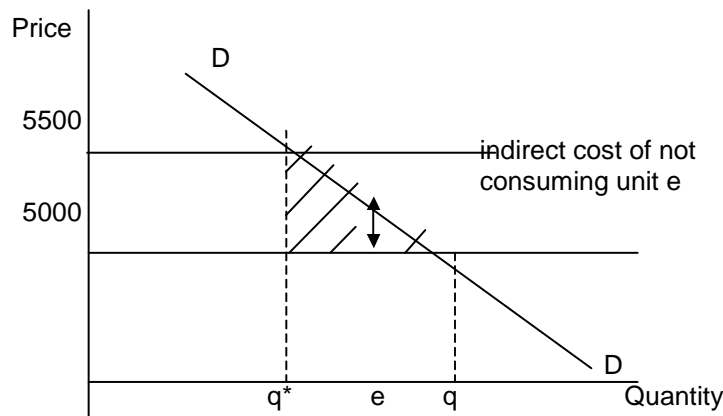
Consider a policy that increases the cost of producing a product, such as a car, from 5000€ to 5500. For example, the fitting of a cleaner engine that produces fewer emissions. The direct cost is the additional cost per unit (500€) multiplied by the size of the market. The size of the market is the number of cars that are bought that include the new technology. This can be represented on a chart as follows:



The line DD shows the number of cars per year that consumers are willing to buy at each price. It is the “demand curve” for new cars. For example, if the market price is 5000 then the number of cars bought is q. If the price rises to 5500 then the number bought drops to q*. In the example here the number of cars sold per year with the new technology is q* and the change in price is 500€. So the total direct cost per year is just 500 multiplied by q*. This can be represented by the shaded area A.

Social welfare loss of a policy measure – a graphical exposition

To illustrate the idea of social welfare losses we can use the same example as was used to illustrate direct costs, a policy that increases the cost of producing a car from 5000€ to 5500. We use the same chart as before. The price increase from 5000 to 5500€ will induce some potential consumers to drop out of the market because they now find the product too expensive. This is shown by the reduction in number of cars bought from q to q*. These lost consumers suffer a reduction in welfare even though they reduce their expenditure on cars, because the price increase has induced them to switch to other products that were not originally their first choice.



But how do we measure this welfare loss? In fact it is quite straightforward. The cost of this reduction in consumption is measured by looking at the difference between the benefit that consumers derived from this consumption – what it was worth to them - and what they had to pay for it (the market price). The difference between these two is the indirect cost of the reduction in output. The demand curve shows the maximum that consumers would have paid for any particular unit of the good. Therefore the indirect cost to the consumer of the move from q to q* is equal to – for each unit of lost consumption – the distance between the demand curve and the original market price. For example, in the diagram above, the arrow shows the indirect cost of not consuming unit e. This cost can be added together for each unit of “lost” consumption in order to give the welfare loss. The welfare loss is the shaded area in the diagram.

Social costs

Social costs are the costs of a policy to society as a whole. Social costs include all compliance costs, government regulatory costs, social welfare losses, transitional costs and indirect costs. The overall focus of a cost analysis should ultimately be on costs to society. This is the appropriate level of analysis for public policy. Therefore, where it is clear that there is a difference between private and social costs, one needs to take this into account during the analysis. This is the case with the use of instruments such as taxation¹⁰. With taxation, part of the private cost to a sector is the money that they have to pay to the tax authority. While this is a very real burden on the sector, this private cost is offset at the level of society as a whole by the revenues received by the tax collecting authority. Therefore, the private costs to the sector are not the same as the social costs¹¹.

Social Cost Category Examples

Real-resource Compliance Costs

- Capital costs of new equipment
- Operation and maintenance of new equipment
 - Administration costs
- Change in production processes or inputs
- Maintenance changes in other equipment

Government Sector Regulatory Costs

- Training/administration
- Monitoring/reporting
- Enforcement/litigation
 - Permitting

Social Welfare Losses

- Higher consumer and producer prices

Transitional Social Costs

- Unemployment
- Firm closings
- Resource shifts to other markets
 - Transaction costs
 - Disrupted production

Wider economic effects

- Impact on innovation
- Impact on product quality
- Impact on productivity

¹⁰ There are a number of other factors besides taxes (and subsidies) that affect market prices and open up a gap between private and social costs. These include the existence of monopolies that raise prices above the costs of production, and the fact that some of the costs of production may not be fully reflected in the market price for a good. These elements are not necessarily an obstacle to a useful cost analysis, provided the distortions to relative prices are relatively minor. However, significant distortions to market prices need to be taken and adjusted for explicitly in the cost analysis. The standard approach is to calculate an adjusted price for using the product/resource. The adjusted price is called a shadow price. The shadow price should represent the "true" cost to society of using a resource, after accounting for all relevant distortions.

¹¹ What is happening in this case is that the tax on the product raises the price that a user pays for it, even though there is no change in the resources required to produce it. Taking the price of the product paid by the user as a measure of the social value of the resources used up in its production would therefore be misleading. Similarly, a product that is subsidised has a market price that is "too low", and does not properly reflect the real cost of producing it.

Some additional types of costs

To be clear, we add to the previous discussion a short explanation of some other types of costs, that are in one way or the other part of one or more of the cost categories we mentioned above.

- *Capital costs and operational costs.* Examples of one-off capital costs are acquiring sufficient knowledge to meet the regulatory obligations, retooling production processes, purchasing or leasing additional equipment and buildings, legal/consultancy fees and training expenses. Examples of recurring and ongoing operational costs are staff costs or time, consumable materials, inspection fees/licences, costs imposed by enforcement processes and by form filing. The output from an assessment of compliance costs will most often be a time profile of costs (a table giving a stream of costs over time) rather than a single cost figure relating to a single point in time. Costs that arise at different points in time have to be weighted before they can be aggregated. This is because resources available now are worth more than a similar amount of resources available at some time in the future, as resources available now can be put to work earlier¹². The weighting procedure that is conventionally used is called 'discounting'. The "present value" are the costs arising in the future into terms of today's money. The "annualised cost" is the cost per annum, or annuity, that is equivalent to a given lump sum in present value terms.
- *Incremental costs and marginal costs.* Costs of a regulatory proposal are only those incremental costs that arise from that proposal. They do not include costs from activities that would have been carried out anyway. Costs of goods and services that have already been incurred or are already irrevocably committed are "sunk costs". However, this does not include buildings or machines already owned by the actor because, if the policy were not to go ahead, the asset could be sold or used for another purpose. When looking at the impacts of a particular policy measure it is often useful to consider how costs change as one moves to slightly stricter or less strict levels of positive impacts. The additional cost of moving from one level to another is called the "marginal cost". Identifying marginal costs is particularly important where there are important threshold effects that involve big changes in cost as one moves from one level to another so that marginal costs rise sharply while the additional benefit might be negligible.
- *Intended and incidental costs.* Intended costs are those clearly related to the purpose or objective of the regulatory proposal. Incidental costs are incidental to this main purpose, although they may, nonetheless, be of significant magnitude. A key purpose of making this distinction is to emphasize that a regulation should be justified primarily in terms of the intended effects associated with it. This does not necessarily preclude the making of a regulation that relies on incidental effects in order to show an overall net benefit.

What about benefits?

Benefits can generally be referred to as reductions in the above-mentioned costs. As an illustration we mention a decrease in compliance costs, a reduction of administrative burdens, positive effects on decisions by companies to invest, positive effects on decisions by companies to innovate, positive effects on the ability of companies to compete. There are of course other benefits, for example for the environment, traffic safety, etc. It should be clear that the overall costs of government action have to be set against the expected benefits. A fundamental requirement of sound policy analysis is that the expected benefits to society as a whole from government action will exceed the overall costs. RIA in some countries is used to demonstrate that there is a net-benefit associated with any proposed regulatory intervention. It is therefore important to note that costs are but one, albeit important, element of the overall effects which arise from any regulatory intervention. The various effects of a policy (its cost and benefits) are also closely related, with changes in

¹² A good analogy is investing money. The earlier one has money available the sooner one can invest it and begin to earn interest or profit. The same applies to all other economic resources.

one effect often affecting another. As a result, changes designed to address compliance costs need to be considered in the light of the effect on the benefits of the policy (for example, abolishing a tax removes the compliance cost but also the revenue from tax. Similarly, abolishing health and safety requirements in the work place may lead to more accidents or even deaths). In designing policy, policy makers need to ensure that the overall mix of costs and benefits provides the greatest net benefit to society. Compliance cost reduction is unlikely to benefit society if it is made the sole objective of major changes or pursued in isolation.

List of economic impacts

The European Commission has distributed a list (see box) of possible impacts which may be useful in a screening process for RIA, to establish effects of a measure and its potential side effects. Whilst the list does not aim to provide a coherent and systematic conceptual framework, it may also be used as a device in a brainstorming session at the beginning of a RIA process¹³.

List of possible economic impacts

Competitiveness, trade and investment flows	<ul style="list-style-type: none"> • Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? • Does it provoke cross-border investment flows (including relocation of economic activity)? • Are the proposed actions necessary to correct undesirable outcomes of market processes in European markets? • Competition in the internal market Does the option affect EU competition policy and the functioning of the internal market? For example, will it lead to a reduction in consumer choice, higher prices due to less competition, the creation of barriers for new suppliers and service providers, the facilitation of anti-competitive behaviour or emergence of monopolies, market segmentation, etc?
Operating costs and conduct of business	<ul style="list-style-type: none"> • Will it impose additional adjustment, compliance or transaction costs on businesses? • Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? • Does it affect access to finance? • Does it have an impact on the investment cycle? • Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? • Will it entail stricter regulation of the conduct of a particular business? Will it directly lead to the closing down of businesses? • Are some products or businesses treated differently from others in a comparable situation?
Administrative costs on businesses	<ul style="list-style-type: none"> • Does the option impose additional administrative requirements on businesses or increase administrative complexity? • Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?
Property rights	<ul style="list-style-type: none"> • Are property rights affected (land, movable property, tangible/intangible assets)? Is acquisition, sale or use of property rights limited? Or will there be a complete loss of property?
Innovation and research	<ul style="list-style-type: none"> • Does the option stimulate or hinder research and development? • Does it facilitate the introduction and dissemination of new production methods, technologies and products? • Does it affect intellectual property rights (patents, trademarks, copyright, other know-how rights)? • Does it promote or limit academic or industrial research? • Does it promote greater resource efficiency?
Consumers and households	<ul style="list-style-type: none"> • Does the option affect the prices consumers pay? • Does it impact on consumers' ability to benefit from the internal market? • Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets)

¹³ Further detailed information on some of the categories is provided by the IA STAR project ("Methodology for appraising the sustainability implications of EC initiatives: the integration of economic, societal and environmental aspects") developed by the JRC in Seville. Details of the original tool are available at <http://www.jrc.es/projects/iastar/>.

	<ul style="list-style-type: none"> • Does it affect consumer information and protection? • Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run? • Does it affect the economic protection of the family and of children?
Specific regions or sectors	<ul style="list-style-type: none"> • Does the option have significant effects on certain sectors? • Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? • Does it have specific consequences for SMEs?
Third countries and international relations	<ul style="list-style-type: none"> • Does the option affect EU trade policy and its international obligations, including in the WTO? • Does it affect EU foreign policy and EU/EC development policy? • Does the option affect third countries with which the EU has preferential trade arrangements? • Does the option affect developing, least developed and middle income countries?
Public authorities	<ul style="list-style-type: none"> • Does the option have budgetary consequences for public authorities at different levels of government, both immediately and in the long run? • Does the option require significant investments, establishing new or restructuring existing public authorities? • The macroeconomic environment: What are the overall consequences of the option for economic growth and employment? • Does it contribute to improving the conditions for investment and for the proper functioning of markets? • Does the option have direct or indirect inflationary consequences?

4. Techniques and datasources for quantifying costs and economic effects

Data collection strategies

As a first step to carry out a data gathering process it is necessary to correctly identify and single out the parties that are directly or indirectly affected by the proposed regulation. It is clear that the identification of interested parties is a horizontal phase, being useful both to assess impacts and gather information and opinions. The data itself can be obtained firstly by drawing on the knowledge and expertise of colleagues. These exercises can be enriched by involving outside experts, by conducting desk reviews of existing research, studies and evaluations, and by utilising the results of consultations with stakeholders. In order to implement an advanced analysis of impacts, RIA-practitioners draw on additional sources of qualitative and quantitative data from various stakeholders (addressees, civil society, national governments, etc.) using a variety of techniques such as interviews, focus groups, questionnaires, etc. In any case it is important to verify that data are readily available from statistical agencies and databases, or can be easily collected on an ad hoc basis. Quantitative economic modeling is also used to quantifying costs and economic effects, but they are more time-consuming and resource-intensive.

Below we discuss three broad categories of techniques and data sources for quantifying costs and economic effects: consultation, statistics and economic modelling. We end with a brief explanation of the recent 'Indicators and Quantitative' Tools of the European Commission.

We will not discuss analytical methods for impact assessment such as cost-benefit analysis, cost-effectiveness analysis, multi-criteria analysis, risk analysis or compliance cost analysis.

Consultation

One of the most valuable tools for collecting information is consultation. A wide range of techniques is generally used to carry out consultations, from test panels (in Denmark, UK, Germany and the Netherlands) to focus groups (more diffused, a part from Hungary and Sweden) and surveys (except, to date, in Poland, Sweden and Denmark), on the basis of the available resources and of the features of the case.

Of course, the quality of data received during the consultation process should also be considered and checked. This applies to statistical data, especially if they come from unofficial or from multiple sources. Also, assessment of the information gathered from the stakeholders is crucial, in particular when such information is the most important source on the social and economic impact of the proposal. The information from the stakeholders should always be subject to assessment of credibility, also with the help of statistical data. We can distinguish between several types of consultations:

Direct consultation with a specific group(s)

In most cases, it is impossible to arrange face-to-face meetings with each and every member of a specific group. The collection of quantified data to support an economic analysis is therefore often done through surveys. The selection and the representativeness of the results will vary with the resources and time available, and of course with the objective of the consultation.

Business Test Panels

The potential of a voluntary and statistically-sound database of individual businesses, could provide an important tool for data collection to be used in support of more prominent statistical surveys. A well-developed Business Test Panel, can be of great importance for supporting other forms of consultation following the problems experienced in reaching individual businesses.

Examples

In Denmark, Business Test Panels have been set up for some years now. This is a process in which a cross-section of businesses is asked directly about the expected administrative burdens of proposed legislation. Within a deliberate effort to minimise respondent burden (a target of a 15 minutes average response time for each form has been adopted), firms are asked for information on both costs they would incur internally and those that would be likely to be contracted to external service providers. Initially launched in 1996, with a panel of 200 firms, the initiative was made permanent in 1997 and was at the same time expanded to encompass three panels of 500 firms each, in order to improve the statistical reliability of the data. Response rates have been high, averaging about 50%. Ministries have discretion about using the test panel procedure, but most have used it for legislation likely to have a significant business impact. Apart from the test panels, Denmark has introduced Focus panels typically consisting of 50-100 companies and formed specifically for the bill or the departmental order that is being assessed. The focus panels are used to assess branch specific legislation. The two types of panels are sometimes complemented by more in-depth, follow-up interviews or round table discussions with a group of companies. Such follow-up activities provide the opportunity to explore the analytical results of the surveys in more detail and to discuss possible alternative ways of regulation that may limit or reduce the administrative burdens on business.

The European Business Test Panel (EBTP) has gone beyond the Danish model by extending the information gathering role of the panels to all expected compliance costs, rather than only administrative burdens. Originally launched in 1998 as a pilot project, the European Business Test Panel is now back in action. A standing panel is being set up which will remain in place for three years. The EBTP is based on a pan-European panel consisting of up to 3.000 selected businesses drawn from a wide range of sectors and sizes, located throughout the Community. Consultation takes place over the Internet to allow for rapid and efficient returns and speedy delivery of results to members. Each consultation should take no longer than 30 minutes. The Commission aims to conduct 6-8 consultations a year on measures, which are expected to have a significant impact on their operations. Proposals for which the EBTP has been used in the past include the revision of the VAT Directive, the fourth Accounting Directive, and the proposal on waste from electrical and electronic equipment. See brochure at <http://www.dti.gov.uk/ewt/ebtp.pdf>.

Model Enterprise/ consumer

There are several different models for discussions with individual businesses and consumers that can either be presented as qualitative results or serve as extrapolations for a specific population.

Examples

In Denmark, the model enterprise programme is a new way of assessing administrative burdens. The first phase consists of the selection of a number of “model” enterprises that are statistically representative of their particular industry segment. In the next phase, the use of existing statistical databases will make it possible to compute total administrative burdens from extensive interviews with a limited number of model enterprises. Thus, the programme is seeking to accumulate knowledge on the factors determining administrative burdens. These factors are expected to include administrative routines and competence, organisation, use of information technology and outsourcing and attitudes toward the regulation. It represents an innovative approach to the issues of RIA data collection and has the potential advantage of removing many respondent biases of survey or consultative based approaches.

Consultation with representative organisations

Consultation with representative organisations such as employers’ organisations are often a valuable source of information. In addition, depending on the proposal, it may be useful to make groups with opposing opinions face each others arguments in meetings, hearings, workshops or conferences.

Participatory approaches

Participatory approaches can be divided into:

- *Dialogue methods*: when the intended users are considered as a source of information needed for the analysis to perform the assessment.
- *Policy exercises*: they build upon the tradition of simulation games. A policy exercise can be described as a flexibly structured interface between scientists and policy-makers. In general, a “game” is set up that represents a negotiation process in which the different teams have a role to play (for example, countries or regions) and is usually done with computer support. A policy exercise is a way to have information on human behaviour and policy preferences.
- *Mutual learning methods*: these methods involve interested parties and citizens who will enrich the assessment with a multiplicity of perspectives, skills and competences. They are considered as “co-producers of knowledge”. Most common forms of mutual learning are the *focus group approach* in which scientists play the role of facilitators and observers; and the interactive approach in which scientists are actively involved as participants.
- *Delphi methods*: its aim is to obtain a balanced assessment from experts, by facilitating the exchange of ideas and information. The method involves a panel of experts who respond separately to a series of questionnaires and the process is repeated in order to gradually produce a consensus amongst the experts.

Broad consultation, using the internet

Combining consultation of representative interest groups with broader consultation exercises on the Internet, involving citizens, academia and organisations with limited resources is rising. Consultation conducted over the Internet can never replace other types of consultation, such as bilateral meetings, hearings or targeted questionnaires. However, it can serve as a useful complement to other consultation channels.

Examples

Under the Commission’s reform programme, DG Internal Market has developed an infrastructure for closed questions, that are automatically transferred to a database for further analysis. DG Enterprise is currently involved in the initial testing of the tool on several consultation initiatives (<http://europa.eu.int/comm/enterprise/consultations/index.htm>). Other consolidated efforts are being made by the Interactive Policy-making Initiative (IPM) providing a new Commission-wide portal . Your Voice in Europe (http://europa.eu.int/yourvoice/index_en.htm).

On-line discussion forums

Use of forums or on-line discussions is increasing in the European Commission, particularly to permit open reflection on the many aspects of the Europe of the future. The discussions are often appreciated and provide valuable input to the debate. Although quite resource-intensive in terms of monitoring and contributions, it could, if rightly targeted and well managed, provide a direct and interesting contribution to the RIA drafting process.

Statistics

In preparing a RIA it is important to verify that data are readily available from statistical agencies and databases. This included data from statistical bureaus such as Eurostat and from private companies that sell databases en datatools. Some notable examples are:

Business statistics

Financial business information is available from different sources. Financial information of Belgian firms for example is processed by the National Bank of Belgium (NBB). Accounts of companies that are registered in Belgium can be searched on line through http://www.centralebilans.be/BA/N/P3_0.htm. Frequent users opt for the annual CD-ROMs or for more tailored solutions.

Other databases are more valuable when the international context matters a lot. The supply of global databases with information of American, Japanese and EU companies is relatively restricted. A good alternative is the AMADEUS database of Bureau van Dijk. AMADEUS is an acronym of 'Analyze Major Databases from European Sources'. This dataset contains at present detailed company information of 31 European countries. AMADEUS has information on: company address, legal form, trade description, industry classification, ownership, income statement, balance sheet, pre-calculated ratios, ... Software, available at all versions, of AMADEUS allows for advanced searching and statistiscal processing. This information is extensie enough to provide for a detailed international comparison of companies operating in the same sector. A DVD of AMADEUS is however rather expensive (+/-12 500 Euro). A demo of AMADEUS can be consulted at: <http://wrds.wharton.upenn.edu/demo/bvd/index.shtml>.

A selection of the variables for each European company shows:

TOAS	Num	Total Assets	GROS	Num	Gross Profit
EMPL	Num	Number of Employees	OOPE	Num	Other Operating Expenses
OPRE	Num	Operating Revenue/Turnover	OPPL	Num	Operating P/L
CF	Num	Cash Flow	FIRE	Num	Financial Revenue
CURR	Num	Current Ratio	FIEX	Num	Fianancial Expenses
SOLR	Num	Solvency Ratio (%)	FIPL	Num	Financial P/L
PRMA	Num	Profit Margin (%)	EXRE	Num	Taxation
RSHF	Num	Return on Shareholders Funds (%)	EXEX	Num	P/L After Tax
RCEM	Num	Return on Capital Employed (%)	EXTR	Num	Extraordinary Revenue
FIAS	Num	Fixed Assets	PL	Num	P/L for Period
IFAS	Num	Intangible Fixed Assets	MATE	Num	Material Costs
TFAS	Num	Tangible Fixed assets	STAF	Num	Costs of Employees
OFAS	Num	Other Fixed Assets	DEPRE	Num	Depreciation
CUAS	Num	Current Assets	INTE	Num	Interest paid
STOK	Num	Stocks	AV	Num	Added Value
DEBT	Num	Debtors	EBIT	Num	Earnings Before Interest and Taxes
OCAS	Num	Other Current Assets	EBTA	Num	Earnings Before Interest, Taxes, Depreciation and Amortization
CASH	Num	Cash & Cash Equivalent	LIQR	Num	Liquidity Ratio
CAPI	Num	Capital	SHLQ	Num	Sharholders Liquidity Ratio
LTDB	Num	Long-Term Debt	GEAR	Num	Gearing Ratio (%)
CULI	Num	Current Liabilities	SFPE	Num	Share Funds per Employee
LOAN	Num	Loans	WCPE	Num	Working Capital per Employee
CRED	Num	Creditors	TAPE	Num	Total Assets per Employee
TURN	Num	Sales	RTAS	Num	Return on Total Assets (%)
COST	Num	Cost of Goods Sold			

IC	Num	Interest Cover	TPE	Num	Operating Revenue /
STOT	Num	Stock Turnover	Employee		
COLL	Num	Collection Period (days)	ACE	Num	Average Cost of Employee /
CRPE	Num	Credit Period (days)	Year		
NAT	Num	Net Assets Turnover	PPE	Num	Profit per Employee
SCT	Num	Cost of Employees /	CFOP	Num	Cash Flow / Turnover (%)
Operating Revenue (%)			GRMA	Num	Gross Margin (%)

Aggregate and macro-economic statistics

Apart from micro-economic financial information, there is also more general or aggregate information available that may be useful for RIA. The NBB for example publishes a range of statistical indicators, as well as links to statistics of other European central banks. The NBB furthermore has developed internal statistics that can be obtained easily (e.g. investment analyses).

Another major source of macro-economic information is the federal Planning Bureau in Belgium. Interesting are the economic forecasts of the Planning Bureau and the many publications with analyses over the mid-term and long term. These publications in many cases can be a valuable source of reference for RIA-analyses.

Specific Flemish information is available at the Flemish Administration (Administratie Planning en Statistiek - APS). It produces, collects, analyses and processes statistical time series. At <http://aps.vlaanderen.be/> around 1300 timeseries are available.

Other databases

Other interesting databanks and data sources are, depending on the issue (for Belgium) RSZ, VDAB, RVA etc for labour market information, NBB and belfirst, BELGOSTAT, New Cronos databases, TRENDS-Top 100 000, Infobel business, the National Statistical Office, The Ministry of finance, The institute for national accounts, and (outside Belgium) the OECD, Eurostat, IMF, Worldbank; etc.

Modeling Tools

Direct Compliance Cost Models

In some cases, social costs are estimated using a *direct compliance cost* method. This is the simplest approach used in estimating costs. Under this approach, the social cost for a policy is simply set equal to the initial engineering or other compliance cost estimates for the compliance options which the firms are likely to adopt.

If only compliance costs are calculated, the social costs are likely to be overestimated. This is because private costs are computed for the pre-policy level of output under the implicit assumption that there is no substitution away from the affected products or activities into other relatively less expensive ones. Nevertheless, using direct compliance costs as an approximation of actual social costs may be reasonable for a policy when price and quantity changes are small, and there are few indirect effects.

Example

An example is the environmental costing model in Flanders (Milieu-Kosten-Model or MKM in Dutch). It is a tool for assessing cost-efficiency of environmental policy. The basic model input is an extensive database of potential emission reduction measures for several pollutants and several sectors. Each measure is characterized by its specific emission reduction potential and average abatement cost. The MKM determines, by means of linear programming techniques, least-cost combinations of abatement measures as to satisfy, possibly multi-pollutant, emission standards. Emission reduction targets can be imposed for Flanders as a whole, per sector or even per installation. The measures can be constrained to satisfy "equal treatment" of sectors and several other political feasibility constraints. It can be used for multi-sector (non-ferrous, chemical and ceramics industry) and multi-pollutant (SO₂, NO_x) analyses.

Administrative costs models

The Commission as well as countries like the Netherlands and Flanders have developed a model for measuring administrative costs. The main aim of the model proposed is to assess the costs of administrative obligations imposed on enterprises, the voluntary sector, public authorities and citizens. Administrative costs are defined as the costs incurred by enterprises, the voluntary sector, public authorities and citizens in meeting legal obligations to provide information on their action or production, either to public authorities or to private parties. Information is to be understood in a broad sense, including costs of labelling, reporting, monitoring to provide the information and registration. The model assesses administrative costs on the basis of the average cost of an action (Price) multiplied by the total number of actions performed per year (Quantity). The average cost per action is estimated by multiplying a tariff (based on average labour cost per hour including prorated overheads) and the time required per action. $\Sigma P \times Q$ (P: Price = Tariff x Time; Q: Quantity = Number of businesses x Frequency). The model focuses on labour costs and overheads because, in most cases, these costs are the main input required to meet administrative obligations.

Examples

Steps followed for the REACH Impact Assessment.
Numerous examples in Flanders and the Netherlands.

Microsimulation models

Based on micro-data these models compute the impacts of various policy changes on small units such as individuals, households or firms. These are characterised by individual properties (e.g. income and expenditures, age, family status, profits). By using a representative sample micro-level changes can be aggregated in order to reproduce macrolevel effects. Typical applications of tax-benefit models are, for example, the calculation of the distributional effects of different tax-benefit policy scenarios (i.e. the calculation of the tax payable, identification of individuals who would gain or lose under a specific policy, etc.).

Examples of EU funded microsimulation models:

EspaSim ETA EUROMOD TAXBEN

Sectoral impact models

Impact models try to calculate the impact of a regulation for a sector or a company. Three parameters can be taken into consideration when assessing whether the compliance costs are attainable for a sector or company:

- the market structure: to what extent can the costs be passed over to customers (depends on level of competition, availability of substitutes...);
- the industry structure (e.g. size, fase in the life cycle, investment cycle...)
- the carrying capacity of the industry: can industry absorb the costs (depends on liquidity, , profitability...).

Examples

An interesting example is the MIOW+ model. Flanders is applying this tool successfully in practice to implement the IPPC Directive and assess BAT. Moreover, the regulatory authorities in England and Wales purchased a copy of MIOW+, with a view to running it alongside their own spreadsheet based calculations so as to compare the results.

MIOW+ is a model that compares the resilience of an industry with and without investments, taking into account the ability to transfer extra costs to customers. The latter is assessed by considering the pressure from international competition and from the market situation.

The MIOW+-model was originally designed to be used at the level of a plant or an individual company. To apply this model at the level of an industry, a (hypothetical) "average" company is defined by averaging the annual accounts of a sample of "representative" companies. The balance sheet of this

“average” company is then used to calculate a number of financial ratios, measuring profitability, solvency, and liquidity. The MIOW+-model allows these ratios to be converted into a limited number of financial strength indicators, the so-called “resilience” scores. The overall resilience score without BAT investments (W1) is calculated as the weighted average of the individual scores (min 1, max 5). Then, the resilience score is re-calculated, taking into account the annual net costs of the investments (W2). The annual net costs equal the gross annual costs of the investment in the candidate-BAT, minus the fraction of the costs that can be charged to customers without a substantial loss of turnover. This fraction is derived by the model from scores for the Market situation (M) and International Competition (IO), both of which have been investigated in the industry analysis (cf. supra).

Partial Equilibrium Analysis

Because of the limitations of using direct compliance costs as a measure of social costs, an alternative approach is to model the economic effects of these compliance costs on producers and consumers using a *partial equilibrium* supply and demand model of the affected markets. This allows for a more complete analysis of social costs and their incidence. "Partial" equilibrium refers to the fact that the supply and demand functions are modeled for just one or a few isolated markets and that conditions in other markets are assumed either to be unaffected by a policy or unimportant for social cost estimation. Such models are sometimes very detailed since they are often complemented by more specific (e.g. engineering-economic) bottom-up models. Analyzing the effects of a policy using a partial equilibrium model of the directly affected markets is a reasonable framework as long as the social costs imposed by a policy are small and do not significantly alter other markets or produce measurable macroeconomic effects (e.g., changes in national unemployment levels).

Examples

PRIMES is a simulation model focusing on European Union energy markets and is as such very useful in analysing in detail the impact on energy markets of measures, such as carbon dioxide emission trading. On the other hand, it is not able to capture some of the impacts which emission trading may induce in the wider economy (e.g. exchange rate effects, trade balances). PRIMES is specially conceived for constructing scenarios and analysing policy impacts. More information is at <http://www.e3mlab.ntua.gr/manuals/PRIMsd.pdf>.

POLES, a partial equilibrium world-wide energy market model, but with a different geographical split than PRIMES. It encompasses the whole world, but has a less detailed breakdown of Member States. This makes it an excellent tool to shed light on interactions with international energy markets as a consequence of EU emission trading. On the other hand, POLES is less suited to detail the effects of sectorally and geographically-limited permit markets. Like PRIMES, it does not capture general economy-wide effects like changes in international trade.

Other examples of EU funded sectoral models: Energy: SAFIRE, Impact, Transport: ASTRA, EXPEDITE, SCENES, REMOVE, Agriculture: CAPRI, Emissions Trading: SIMAC

Examples

MARKAL (zie <http://www.etsap.org/markal>) is a long term multi-period energy technology optimisation model. It has been developed over a period of almost 20 years by an international users group ETSAP (Energy Technology Systems Analysis Programme), through IEA. MARKAL has been used in the past for a wide variety of problems, ranging in geographical scope from the energy problems of a city to the energy problems of a large country like the US. The Belgian version of the model represents the energy flows going from the mining, import or production of energy over the transformation up to the level of delivering energy to the demand sectors. The basic components in MARKAL are energy and environmental control technologies and demand for energy services. The main energy transformation and energy use processes in the Belgian energy system are included. The demand for energy services is separated in demand from the industrial sector, the residential sector and the transport sector. Within the industrial sector, the demand is further disaggregated by subsector: the energy intensive sectors (iron and steel sector, the chemical sector, the building material sector) are subdivided into subsectors up to the level where sector specific installations or technologies can be identified, whereas for the other sectors, four main demand categories are distinguished. The residential sector distinguishes between the residential and small commercial, with four subsectors, and the large commercial and service sector and for each sector five subcategories of demand (space heating, water heating, food preparation and electricity use) are specified. The costs in the different periods are weighted using a discount factor. It assumes perfect foresight of the economic agents over the entire horizon. The model chooses energy production and consumption options that maximise the net total welfare of the energy users and producers, given exogenous bounds on total emissions (CO₂ and/or other pollutants).

Multi-Market Models

Multi-market models go beyond partial equilibrium analysis by extending the inquiry to more than just a single market. Multi-market analysis attempts to capture at least some of the interactions between markets. However, multi-market models do not attempt to incorporate a representation of the entire economy. They are not able to capture interactions between a large number of sectors. Some policies, such as energy taxes, can be expected to have an impact on a large number of sectors both directly where the policy is applied, and indirectly through spillover and feedback effects on those and other sectors.

Macro-Economic Models

Macro-economic models have the ability to account consistently for the linkages between all sectors of the economy. Four types of models are being used for the analysis of social costs.

- *Input-Output (I/O) Models.* The central idea underlying I/O analysis is that production activities are closely interrelated. An I/O table can be turned into a simple linear model through a series of matrix operations. The intermediate inputs matrix defines a matrix of technical coefficients, based on the assumption that inputs to production are consumed in fixed proportions to output and that there are constant returns to scale. The model is manipulated by making exogenous changes to the vector of final demands. The model will then calculate how much of each of the intermediate goods is required to produce the new final demand vector. Although I/O models can be a useful as a consistency check or as a first-order approximation, they have a number of shortcomings that limit their applicability as a predictive tool: prices are normally assumed to be fixed, there is nothing to ensure that the total demands generated by manipulation of the model are consistent with the actual productive capacity of the economy, the fixed coefficients assumption leaves no scope for substitution of inputs in production etc.

Examples

An interesting example of the methodology in Flanders is Peeters (2000).

- *General Equilibrium (CGE) Models.* CGE models calculate a set of prices in a way that all the markets of the economy are in equilibrium, implying that resources are allocated efficiently. Parameters and coefficients are calibrated with mathematical methods and not

estimated as in econometric modelling. They can be static comparing the situation at one or more dates – or dynamic – showing developments from one period to another. CGE models require a Social Accounting Matrix that is built by combining Input-Output tables (to model interrelations between productive sectors) with national account data. The weakness of CGE models is their somewhat tautological construction (all results are implicitly linked to the assumptions and calibration made). In contrast to macro-econometric models CGE models can be used only for simulation purposes, not for forecasts. Another disadvantage compared to sectoral models is that, in following the top-down approach, CGE models typically lack a detailed bottom-up representation of the production and supply side.

Example

GEM-E3 is an example of a successful CGE model developed by the research community with European Commission (DG RTD) funds. It is an applied general equilibrium model for the European Union Member States taken individually or as a whole, which provides details on the macro economic situation and its interaction with the environment and the energy system. The model is being used to evaluate policy issues for the European Commission. Several DGs (ECFIN, COMP, ENV, TAXUD, RTD) have used or are using the model. At present, the model is operational for EU-15 member-states, while further development is under way. For more information see <http://gem-e3.zew.de/geme3ref.pdf>.

Other examples of EU-funded CGE models: EDGE GEM-CCGT OECDTAX PACE WORLDSCAN

- *Macro-econometric models:* These models are empirical and are developed using coherent datasets. The parameters of the equations are estimated from data. They are fundamentally designed to evaluate macro-sectoral impacts of policies. The strength of macro-econometric models relies on the validation of the equations of the model with statistical methods and on the possibility to provide forecasting in the short and medium term, as well as evaluating the impact of policy. Moreover, these models ensure a coherent framework of analysis for analysing inter-linkages between variables. The weakness of such models is that it is difficult to catch longer run phenomena, since the equations on which they are based are linked to a given time framework. Moreover, due to the extensive need for data the degree of sectoral disaggregation is usually smaller than in calibrated CGE models.

Example

The QUEST model, developed in DG ECFIN, is an example of a macro-econometric model. It was designed as a tool to simulate the economic impacts of policies, and to analyse the economies in the Member States of the European Union and their interaction with the rest of the world. A [detailed description](#) is available on the Commission's web-site¹⁴.

Other examples of EU funded macro-econometric models: E3ME NEMESIS QUEST II WARM For Flanders and Belgium, we can mention HERMES (see www.plan.be for a description).

¹⁴ http://europa.eu.int/comm/economy_finance/publications/economic_papers/economicpapers123_en.htm

Suitability of models with respect to selected criteria

	CGE models	Sectoral models	Macro econometric models	Microsimulation models
Range of coverage of measure				
Single-market analysis without economy-wide impacts		x		
Single-market analysis with economy-wide impacts	x		x	
Multi-market analysis with effects in secondary markets	x		x	
Purpose of model analysis				
Simulation (long-term)	x	x		x
Forecasting (short-/medium term)			x	
Effects to be analysed				
Economic effects (within given model framework)	x	x	x	
Distributional effects				
between countries	x		x	
between sectors	x	x	x	
between households	x		x	x
Degree of disaggregation				
Between sectors or households				
potentially high	x			x
potentially low			x	
Within a sector				
potentially high		x		
potentially low	x		x	
Effects on:				
GDP	x		x	
Unemployment	x		x	
Public budget	x		x	
International trade	x		x	
Household income	x		x	x

The European Commissions' IQ tools project

The 'Indicators and Quantitative Tools for Improving the Impact Assessment Process for Sustainability' (IQ TOOLS) project has the objective to build an internet-based software to provide desk officers with information on good practice and on models and tools available for quantitative assessment. In addition, it will provide guidance on identifying the possible economic, environmental and social impacts of policy initiatives. The user is guided by a list of keywords (including policy areas, impacts and instruments) through a review of previous IAs, an overview of impact data and a guide to selecting models. IQ Tools will also build several important inventories:

- A *good practice inventory* will be set up on the basis of a review of IAs carried out in 2003 and 2004. The inventory will provide a brief description of these practices with references to completed IAs.
- An *impact inventory* will provide information about the main impacts and links to relevant information from Eurostat regarding data and methodology for each impact). The inventory should help desk-officers to identify and structure the impacts associated with a given policy proposal.
- A *model inventory* will provide information on tools used at the Commission and integrating the different dimensions of sustainable development. It describes the

potentials and limitations of existing models, including their interlinkages (e.g. which outputs of a model can be used as inputs in other models). This tool intends to assist desk officers when launching external quantitative studies for IAs.

- In addition, a *quantitative model* will be made available to analyse interlinkages and indirect effects across specific impacts and separate policy areas or sectors. A Computable General Equilibrium (CGE) model will be expanded to provide quantitative results for selected measures and basic impacts.
- The software will also provide simplified *on-line simulations* for specific policy issues.

5. Further research

The purpose of this working paper was to explore the type of information that is considered necessary or desirable for performing a good RIA on the one hand (demand side). On the other hand, we wanted to examine the range of techniques and data sources that can be and/or are being used at present in RIAs (demand side).

In the next phase of the research project, we will confront demand and supply and look for opportunities to narrow the current gap between supply and demand.

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