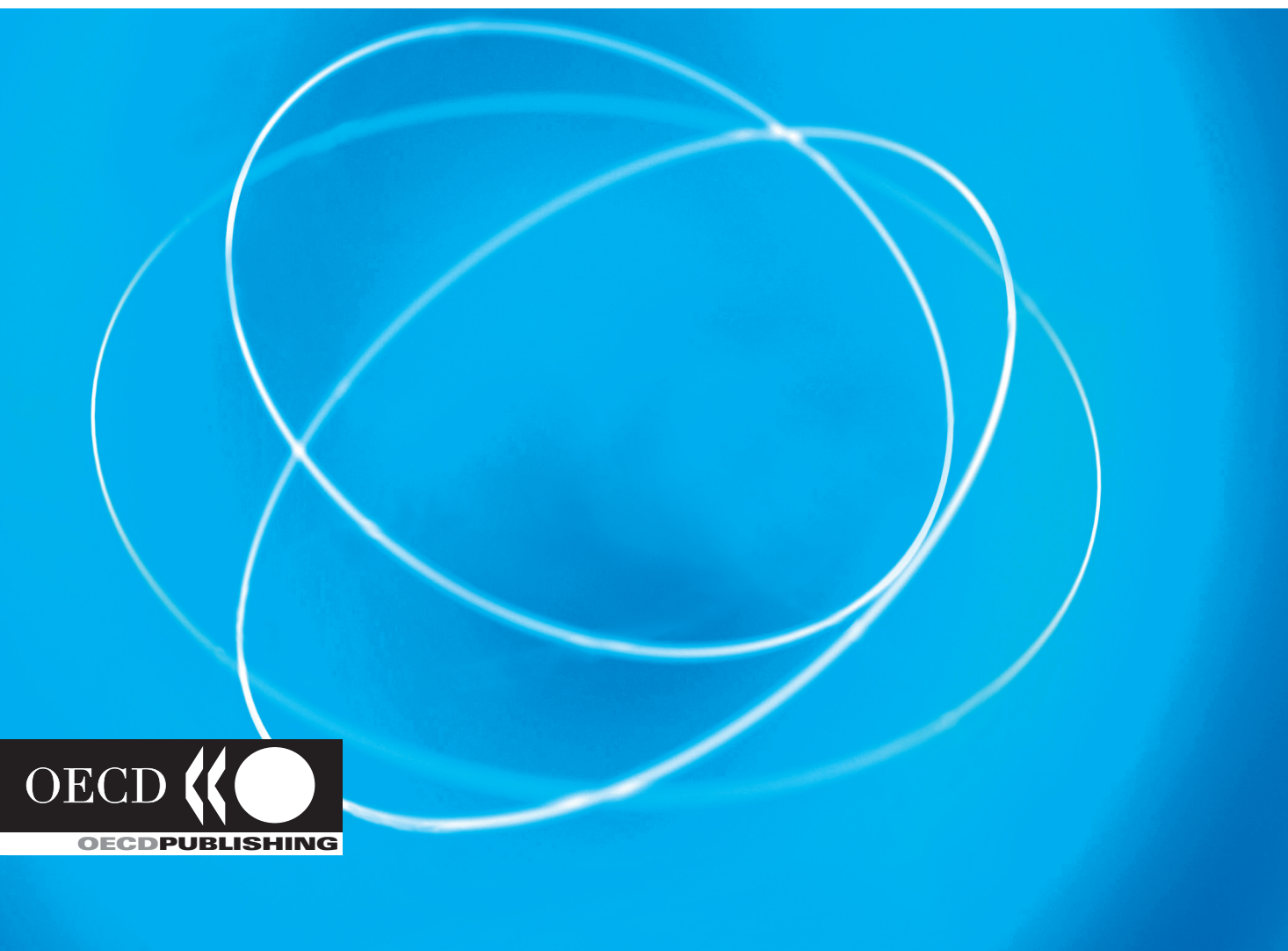
OECD Sustainable Development Studies

Subsidy Reform and Sustainable Development

ECONOMIC, ENVIRONMENTAL AND SOCIAL ASPECTS



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Foreword

This report contains the proceedings of an OECD workshop on subsidy reform held in Paris on 5 October 2005 under the auspices of the horizontal programme on sustainable development. The intent was to explore, through sectoral case studies and panel discussions, the economic, environmental and social dimensions of subsidy reform. An integrated perspective on subsidies, including their costs and benefits, can lead to greater transparency about their impacts and more public understanding of potential distortions. It can also provide a range of arguments for overcoming vested interests to prompt subsidy reform.

This workshop was the third in a series of OECD meetings on reforming environmentally harmful subsidies. The first workshop in November 2002 introduced a "checklist" to identify those subsidies whose removal would benefit the environment (see OECD (2003), *Environmentally Harmful Subsidies: Policy Issues and Challenges).* The second workshop in November 2003 focused on developing a framework for defining, classifying and measuring subsidies across sectors (see OECD (2005), *Environmentally Harmful Subsidies: Challenges for Reform*). The third workshop in October 2005 deepened understanding of the political economy of subsidy reform. A fourth workshop is planned for 2006 which will assess integrated "whole-of-government" approaches to reforming subsidies, including analytical frameworks, governance aspects, and transition needs.

It should be noted that the papers in this volume reflect the views of the authors and not necessarily those of the OECD or its member countries.

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Introduction

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Subsidies are an ideal subject for sustainability assessments since they have economic, environmental and social ramifications. Government supports are pervasive in OECD countries, among the most powerful public policy instruments. They often introduce economic, environmental and social distortions with unintended consequences. However, subsidies can also contribute to economic, environmental and social goals, *e.g.*, when they are used to finance research or protect the environment.

Subsidies come in all shapes and sizes. In fact, it has been difficult to arrive at an agreed definition of a subsidy. According to one OECD definition, "*A subsidy is a measure that keeps prices for consumers below market levels, or keeps prices for producers above market levels or that reduces costs for both producers and consumers by giving direct or indirect support*".

Subsidies can be found in all economic sectors. This volume contains case studies of successful and unsuccessful attempts at subsidy reform in agriculture, fisheries, industry, energy and transport. The many types of subsidies and sectoral peculiarities make the comparison and assessment of subsidies across sectors and countries a continuing challenge. Two papers in this volume discuss tools for improved analysis and comparability of subsidies, including checklists and accounting approaches.

Subsidies can take the form of direct grants or payments to consumers or producers, as discussed in the case study in this volume on Norwegian financial transfers to the fisheries sector. They can constitute buy-backs of production rights as described in the Canadian study on licence retirement programmes for fisheries. They can be embodied in tax credits or exemptions as seen in tax deductions for commuters in Austria. Subsidies can be provided through the provision of low-cost inputs, infrastructure or services, such as the supply of low-cost irrigation water to Australian agriculture, now the subject of reform. Or they can be extended through preferential regulations as in the cases of permitting for industrial zones in the Czech Republic and land use zoning for transport and parking in Austria.

Subsidies have a range of impacts at both national and global level (**Table 1**). Economically, they can distort prices and production levels, impede structural adjustment while aggravating budget deficits. At the international level, subsidies distort trade and competitiveness with adverse impacts on the development prospects of non-OECD countries. With regard to the environment, subsidies can encourage overuse of fossil fuels and other inputs to production or lead to the over-exploitation of resources while contributing to harmful emissions and waste. These ecological impacts easily spill over to the global sphere. Socially, these supports can redistribute income from consumers to

producers and distort financial and resource allocations across firms and sectors as well as countries, with adverse effects on overall living standards.

Table 1. **The diverse impacts of subsidies**

	DOMESTIC	GLOBAL
Economic	Prices Production Levels Budgets	Trade Competitiveness Development
Environmental	Pollution levels Resource use	Climate change Loss of biodiversity
Social	Income distribution Employment	Equity Living standards

Subsidy reform, on the other hand, can lead to fiscal savings, structural adjustment and enhanced efficiency and productivity in production. Environmentally, the reduction of harmful subsidies can lower negative externalities such as pollution and waste. Socially, subsidy reform can lead to a more equitable distribution of income and balanced long-run growth of communities and countries. A more even playing field at international level in the absence of subsidies will benefit both OECD and non-OECD countries. The many advantages which stem from reforming subsidies are described in the papers in this volume.

Subsidy reform demands integrated assessments and whole-of-government approaches. Sectoral Ministries as well as those dealing with finance, economics, environment and social issues must all be involved. Ongoing work on subsidies is the most cross-disciplinary of the OECD, involving Directorates and Committees concerned with trade, development, industry, agriculture, fisheries, energy, transport and environment. Through further analyses and workshops, the OECD horizontal programme on sustainable development intends to push the categorisation and comparison of subsidies, their integrated analysis and assessment, and co-ordinated and enlightened approaches to their reform.

Chair's Summary

Lori Ridgeway

Chair of the OECD Committee on Fisheries

Introduction

I was pleased to Chair this interesting workshop as an ongoing part of the OECD cross-cutting project on reforming environmentally harmful subsidies, under the auspices of the OECD Annual Meeting of Sustainable Development Experts (AMSDE). This workshop focused – as the third in a series of workshops on subsidy reform – on the political economy of reforming environmentally harmful subsidies. This was a workshop in which we moved beyond the technical aspects of the implications of certain kinds of subsidies on the environment, to instead discuss the difficult issue of how to implement reform of these subsidies, *i.e.* moving from the "what" to the "how".

In addition to both a contextual review of frameworks for assessing subsidies and a closing panel discussion, seven case studies were considered, covering aspects of subsidies related to agriculture, fisheries, coal, enterprise zones and transportation. These sectors were well chosen for this workshop, as subsidies in these same sectors have already been considered in previous sessions in terms of the nature of their linkages to the environment, as well as the application of a "checklist approach" to evaluating the role of subsidies in these sectors' policy tool-kits. This analysis is well outlined in *Environmentally Harmful Subsidies: Challenges for Reform* (OECD, 2005), which shows that the potential benefits from subsidy reform in these sectors are large.

The context for this workshop was well set by that Report. In addition to showing that there is a considerable way to go in reforming these subsidies, it notes the following:

> "…The removal of [such] harmful subsidies therefore offers the tantalizing prospect of a "win-win" situation, both for the economy and the environment. Yet governments around the world have been reluctant to dismantle perverse subsidies, despite growing environmental awareness and pressures on government budgets..." (p.113)

In other words, we continue to live in a seeming "lose-lose" situation, in these contexts at least. It is clear there are opportunities for action, but there are clearly political and economic impediments to overcome in implementing subsidy reform. Since government policies are ultimately a consequence of political choices, it is necessary to examine the political incentives and motives of policy makers, which was the topic of this workshop.

The very nature of underlying decision-making contexts, institutions and especially political contexts is, by nature, situation-specific. The challenge for this workshop was to

step back and understand lessons that are transferable to other reform situations, and to help plan future OECD discussions on this topic.

Among many issues, key questions that were relevant to the workshop included:

- the original motivation for the existing subsidies (in other words, the "stakes" at play);
- the motivation for change (whether these be crisis, opportunistic reform, the results of a rational diagnostic, internal pressure for reform, external pressure for reform);
- the key players and potential "gainers" and "losers" from reform;
- the key opportunities, synergies or alliances that helped the momentum for reform;
- the nature of the key obstacles;
- strategies and or tactics that maximised synergies or overcame obstacles (including neutralising "rent-seeking" behaviour by affected interests that prevent reforms from being implemented);
- the nature of governance issues (how interests were accommodated in the decision-making);
- the role of information and transparency;
- whether reform was an isolated event or part of a broader reform effort;
- transition issues, tools and policies;
- ultimate impacts in a sustainable development context; and
- the lessons learned (what would change if one had to make the same reform again?).

Context-setting presentations presented by Anthony Cox, OECD Directorate for Food, Agriculture and Fisheries (*Overview of Approaches for Assessing Subsidies*) and Maja Larsson, Sweden (*Accounting Approaches for Assessing Subsidies and Taxes*) provided a lively start to the workshop by showing that there is room to break new ground in data and analytical methods on a parallel track to understanding the practical issues of reform.

Even though the Cox paper provided a practical tool for subsidies evaluation, which contrasted with the formal accounting-based approach presented by Larsson, each aimed at a different aspect of the subsidies issue, they both emphasized the interdisciplinary nature of the reform issue and the need to continue to share experiences and best practices. Discussion of these two presentations opened several aspects of debate that were to arise throughout the sessions: 1) the extent to which subsidy reform is dependent – or not – on a common definition and methodology for measuring subsidies; 2) the role and assessment of environmentally-*motivated* subsidies; and 3) how to account for the role of "policy filters" (terminology from the checklist approach that refers to offsetting policies and management that can alter the effect of subsidies on the environment). The checklist approach shows that these are critical to understanding and evaluating the role and impact of subsidies, whereas modelling and accounting approaches make it difficult to take such impacts into account when calculating impacts. This shows that there is a

need for complementary analyses in fully understanding and evaluating the impact of subsidies on the economy and environment.

The sessions on case studies featured four presentations in the agriculture and fisheries sectors: Vangelis Vitalis, New Zealand (*Subsidy Reform in the New Zealand Agriculture Sector*), Roland Pittar, Australia (*Water Reform and the Agriculture Sector in Australia*), Jan-Frederik Danielson, Norway (*Subsidy Reform in the Norwegian Fisheries Sector*), and Gorazd Ruseski, Canada **(***Subsidies and the 2003 Cod Fisheries Closures in Canada*). The fisheries and agriculture sectors are areas where there is a presumption of significant direct environmental gain from subsidy reform, and also where both sectors have visible and powerful vested interests, not the least because of implications for rural livelihoods where there are often few alternatives. The Ruseski paper differed from the others in terms of its having demonstrated a choice not to use a transitional subsidy to assist structural reform, in contrast to the past, whereas the others cases featured reforms of existing subsidies.

The other case studies featured a more regional-, sectoral- or geographically-motivated set of issues, including industrial subsidies intended to promote economic development, and highlighting, in these cases, the environmental externalities of subsidy-induced production or activities: Miroslav Hajek, Czech Republic (*Reform of Enterprise Zone Subsidies in the Czech Republic*), and Peter Franz and Harald Neitzel, Germany (*Reform of Hard Coal Subsidies in Germany*). In addition, another case study by Karl Steininger and Franz Prettenthaler**,** Austria (*Reforming Counterproductive Subsidies an Austrian Transport*) also focussed on the externalities of various pricing and subsidy choices in transportation intended to affect – or offset – location decisions. Both the Steininger/Prettenthaler and Hajek papers differed from all the others in terms of being *proactive* evaluations of the need for subsidy reform for environmental purposes (which had not yet, however, taken place) driven directly or indirectly by environment departments. The political economy issues in these cases would be the extent to which these review efforts would result in future reforms – a question that can be revisited in the future.

A panel discussion of participants from the intergovernmental and non-governmental organisation (NGO) communities – Dave Boyer (International Institute for Sustainable Development), Mark Radka (UNEP), Mathias Seiche (Friends of the Earth) and Scott Vaughan (OAS) – ended the workshop with an equally lively and valuable debate.

Considerations from the Case Studies

Prior to outlining generic lessons and issues from the broad discussions in the workshop, this section outlines some broad similarities and differences in the case studies themselves, which shows considerations that future reform exercises may wish to exploit (and which future workshops may wish to examine further). These cases show that reform strategies and tactics are context specific, but that some general conclusions can be drawn or further investigated.

Motivations for the original subsidies varied across the case studies but mainly focused on: 1) regional and sectoral promotion and development and job creation (including, in one case, the use of windfall government revenues); 2) an attempt to overcome market failures in the provision of infrastructure; and 3) past attempts to ease the transition of structural reform. In several cases, the subsidies were originally thought to be short term, but became instead imbedded in the sector and in expectations. Often

subsidies were embedded in a more general set of "preferences" enabled by government policy or programmes favouring the affected sectors, a factor that may not yet have been emphasized in the work on subsidies reform, and which thus might overstate the environmental benefits of subsidy reform alone when induced environmental harm is correlated with the entire cluster of preferences.

The *motivations for subsidies reform* also varied somewhat across the cases discussed. As noted above, only two demonstrated a potential future reform based on current *proactive* analysis (led or contracted by government environmental interests). These efforts may result in subsidy reform in the future if taken up more broadly in government processes. Other case studies were examples of *ex post* analysis, where motivation for reform was most often a combination of some external crises (fiscal and economic, climate or resource). In most cases, the subsidy reform was part of a more general reform of policies and approaches, sometimes aided by a change in political orientation. Only in rare cases, at least as described in the workshop, were environmental issues a direct *driving* motivation for reform, although environmental impacts did figure in some problem definitions in the case studies. While leverage from multilateral processes and rules were cited as a potential motivator for subsidies reform, they did not play a large role in the cases described in this workshop, but were described as possible consideration for the future.

Synergies and opportunities that could be exploited certainly did help the momentum for reform in several cases, showing the broader potential role for opportunistic reform. Sometimes these included stakeholder groups – such as well-performing segments of sectors or regions – that could be used to help offset other lobby efforts, including through direct appeal into the political system (for instance, on grounds of equity). In some cases, political or other events allowed an alignment of stakeholder interest that had otherwise been elusive. Generally the bigger the reform effort – breadth and depth – the easier it was to achieve narrower targeted subsidy reform efforts, especially if stakeholders across diverse sectors were being similarly affected. The case of New Zealand is often cited in this respect, as it was in this workshop. In this case, the very crisis that induced the reform was seen as an opportunity, as it allowed a bigger-bang approach than might otherwise have been politically feasible. The subsidy reforms that were embedded in broader reforms also benefited from an alignment of agendas that help overcome impediments – and included modernized policy frameworks that attacked incoherent preferences more holistically.

There were a number of common *obstacles to reform* highlighted by the case studies. Not surprisingly, lobbying interests with strong links into the political system (traditional rent-seeking behaviour) had to be overcome. Anxiety over the social consequences and dislocation from reform of subsidies programmes was an early impediment. Presenters of several case studies argued that "myths" surrounding either the need for subsidies or the costs of reform were an obstacle, and just as interestingly, on the other side of the coin, others said that a lack of a well-understood "justification" for reform was an impediment (presumably relating to a lack of understanding of either costs of subsidies or benefits of reform). The two "proactive" case studies referred to a lack of rigorous analysis and decision-making around the provision of new subsidies for regional or sectoral development – especially in accounting for negative environmental impacts – as playing a role in their proliferation. In some cases, especially where subsidies reduction or elimination (or avoidance) was part of a broader policy reform, new approaches or tools needed to be developed. Issues of economic security and sovereignty – sometimes of the highest political order – were also sometimes at play. The nature of these and other

obstacles provides considerable food for thought on subsidy reform – which was barely scratched in this workshop.

Strategies to overcoming obstacles to subsidy reform focussed on some key common themes. Key among these was the need for high-level political support if not, more often, political leadership. External pressure and especially fiscal and economic crises that helped limit options that allowed accelerated progress also played a key role in a few cases. This highlighted the helpful role that can be played by some central government agencies such as Treasury/Finance departments as agents forcing change. However, in other cases, a gradual approach was viewed as the critical success factor. Whole-of-government partnerships were instrumental in most cases, generally enabling whole-of-sector approaches to reform of preferences in cases where multiple jurisdictions have a role in different aspects of sectoral performance. In all *ex post* case studies, partnerships at the government level and with affected stakeholders – especially dissenters – played a large role, including in some cases, at the problem diagnostic and analysis phase. Timing issues also played a role, with emphasis placed on timing that would allow subsidy reform to take place in an economically advantageous phase in business or sectoral cycles (indicating a role for proactive analysis). Proper sequencing of reforms was also cited as an important lesson learned, especially to enable easier transition (such as trade liberalisation to better enable sectoral recovery and growth expected from subsidy removal; however, it was also noted that the downside of perfect sequencing is delayed reform).

Interestingly, as is clear from the above, *complementary measures* to subsidy reform played a large role in all cases where reforms had taken place, ultimately resulting in a substantially reformed overall policy mix. This included, on one hand, accompanying tariff reduction and trade liberalisation, pricing reform and broader structural reforms that favoured the increased role for market signals and alternate sources of production, and on the public sector management side, complementary management measures, new policy and management frameworks and new planning frameworks accompanied reforms. Rarely if ever was subsidy reform in these cases taken in isolation. Again, this suggests whole-of-government approaches.

In terms of *vested interests*, the cases were weaker in describing these than might have been expected, and thus there was less discussion of *tactics* for overcoming them than might have been hoped. This may have been due to the written nature of the cases in the face of sensitive information, but discussion did not reveal considerable additional information. The generic role of strong political leadership was clearly most poignant here but studies did not directly address *how* this was applied. To some degree these issues are covered above, but there is also room for future workshops to further investigate this issue. Reading between the lines of issues, where difficult interests were private stakeholders, partnerships were used to co-opt them in decision making, as was the mobilization of counter-interests. The issues were a bit more difficult where vested interests were political. Strong fiscal departments were seen by some as a helpful force in removing options in such cases. The most intractable case is when issues of national and economic security are at stake and the issues are of the highest political order with voters. Related to this issue of entrenched interests was the reminder that short-term subsidies can quickly become permanent subsidies, as subsidies become imbedded in planning and expectations, prices (including of capital), resource allocation, and communities' assets, creating vested interests where none had existed before.

Governance is a subject ripe for future workshops, as it is the decision-making process that will determine the success of reform intentions. Partnerships and joint decision-making were integral to all reform efforts, whether intra- or inter-governmental, partnerships with affected sectors, and with a critical role for public consultation. Several cases pointed to a role for strong leadership, not only at the political – but the bureaucratic – level. The latter was seen to be critical where intra-governmental interests had to be brought together and individual ministries may not have had sufficient convening power. This is further complicated when inter-governmental processes need to be brought together. As well, several cases showed an important role for *ex post* evaluation and audit in ongoing planning and decision-making processes. The checklist approach also assumes such adaptive management, and ideally would include evaluation of governance structures themselves in having led to efficient reform processes.

Case studies showed little discussion of *transition measures* and transition planning. One case study, however, examined explicitly the issue of avoiding transition subsidies, due to a combination of *ex post* evaluation that had shown them to be ineffective in the past, and due to the risk of making transition assistance appear as a broad-based entitlement in the face of future possible structural reforms. A broader tool kit of economic diversification was preferred. In other cases, fiscal crisis prevented their consideration. It was generally acknowledged, however, that it is unrealistic to assume that one can avoid all transition assistance, and some modest assistance (debt relief) was put in place even in the biggest-bang approaches. The issue with transition subsidies is, however, the trade off with the pace of reform, as even transitional assistance can affect adaptation to new circumstances, as shown in one of the fisheries case studies.

In all cases, there was a major role to be played by *increased transparency and information* on the amount and costs of subsidies and their impacts. It was seen as critical to offsetting myths, and selling the benefits of reform. An understanding of the actual and opportunity cost-effectiveness of subsidies was seen as critical to building coalitions for reform and neutralizing those more resistant to change. A more difficult debate centered around whether subsidies data needed to be on internationally comparable basis, which is presumably more important, however, when one is relying on external levers such as WTO disciplines rather than other drivers for subsidies reform (see below). However, even national transparency can presumably benefit from some idea of international relativities, although there was no agreement on the importance of comparable data as a prerequisite for reform.

Lastly, in terms of *impacts of reform*, in most cases, economic and environmental benefits from subsidy reform were clear and unequivocally opposite to myths of likely sectoral demise. Economic benefits included fiscal savings, enhanced restructuring, higher post-reform productivity in the affected sectors, increased exports in some cases, increased investment, and increased economic diversification. The profitability of remaining non-subsidized participants increased in case studies examined. Clearly some of these benefits were easier to realize when alternate opportunities were available to those who were displaced in accompanying structural reform, but in no case was the resulting economic result worse than had been forecast, and in virtually all cases – better. As well, market signals were improved, resource allocation more efficient, and in one case "technical lock-in" was also reduced (Australian water dependence in agriculture), leading to more diversification of opportunity and reduced economic risk.

Environmental benefits included both direct and indirect impacts. Environmental benefits – or risks of environmental harm – were direct in the case of primary (agriculture

and fisheries) and other land-intensive activities, and externalities such as pollution have been reduced in other cases. Agricultural subsidy reform benefited pesticide, water and land-use intensity. The risk of over fishing was reduced especially if management regimes were also modified as part of the reform package.

Social impacts were not as straightforward. Short-term community impacts and job losses were unavoidable in some cases, and the most frequently cited concern. In some cases, mitigating policies were of assistance including transitional income assistance, regional development tools and debt forgiveness. Traditional safety nets played a role. However, longer run social benefits of reform were also cited, including increased equity, infrastructure modernisation, reduced dependency and more balanced community growth.

Lessons Emerging from the Workshop

The following overall observations are drawn from the nature of the discussions of the cross-cutting papers, case studies and the panel discussion.

a) *On the whole it was difficult, in some cases, for workshop participants to stay focused on political economy issues*. It is a difficult debate and raises difficult and sensitive issues. It seemed often that it was easier for participants to return to traditional discussions of the harmful effects of subsidies – the normative aspect of reform – than to debate the practicalities of it. There is work needed, it would appear as well, to help ensure a paradigm under which such issues can be analysed. The issues above were introduced by the Chair on the basis of some logic but were not grounded in any particular or well understood paradigm – especially one that might help ground discussions of solutions and mitigating strategies in the face of rent-seeking behaviour.

In some cases it was made explicit in discussions – sometimes in (exasperated) response to queries of why a simple understanding of the *importance* of reform was not enough to induce it – that issues (especially those of the highest political order) are not necessarily due to a lack of *understanding* of the issues or an *appreciation of the benefits* of reform. Indeed it was noted that the nature of the policy choices may be quite explicitly and transparently debated, and analysis of tradeoffs freely available to the public. Rather, other obstacles may prevent – possibly even permanently – subsidies elimination (even if reduction is possible). In such cases, better targeting of remaining subsidies becomes a premium, and presumably should be, as much as possible, decoupled from environmentally harmful activity. This reinforces the need for future work to stay focused on the political economy of reform in order to understand how to move from intent to implementation, and how to improve the policy effectiveness of regimes when complete reform is not possible.

Part of the reason for this occasional discontinuity in the debate between normative benefits of reform and political economy issues may also have rested in the nature of participation in the workshop. A sharing of experiences on the strategy and especially tactics of reform likely needs exchanges of views among also those who have shepherded reforms through bureaucratic and political decision-making processes – which now calls for experience in policy activities to complement those with technical, environmental or trade expertise. It also may imply a need to change the mix between oral and written aspects of case studies when sensitive aspects such as this are discussed.

b) The workshop highlighted clearly the importance of the relationship between the political economy of reform and an understanding of environmentally harmful subsidies in the context of all three pillars of a sustainable development. This reflects a maturing of the environmentally harmful subsidies project. It is not sufficient that the issue of subsidies impacts be understood solely by environmental and trade and economic interests. A mainly environmental and economic/trade focus may have been appropriate when trying to understand the economic and environmental impacts and costs of certain kinds of subsidies, and the importance of creating a normative subsidy agenda (which also, one should note, tends to operate in a comparative statics framework). Rational public interest is not, however, always mapped one-to-one into political goals. The political economy of reform focuses on information needed for effective decision-making, and an understanding and overcoming of obstacles to reform including those aspects of reform that play most directly into political agendas, which are heavily affected by social and community outcomes.

Discussions in this workshop confirmed that often *the most difficult aspects of reform related to understanding and handling short-run social impacts of dismantling of subsidies*, and understanding the social costs of inappropriate subsidies (so as to be able to debunk myths, show the benefits of reform and or to manage the impacts and transitions appropriately). The "Checklist approach" may need to move beyond environmental impacts alone to be augmented into a sustainable development framework.

c) There is a huge role for information, analysis and transparency on the amount, nature and opportunity costs of subsidies as part of reform efforts, in order to tell the story of the benefits of reform, overcome myths and build allies for change. Discussions emphasized the benefits of shared and partnered analysis to build buy-in and ownership to the results and implications. The negative aspects of subsidies removal were, in these case studies, less than feared and the benefits greater. (It was emphasized consistently that the catastrophic predictions of reform opponents were not realized – subsidy reform did not lead to the downfall of the particular industries. There is a need for a sharing of experiences and dissemination of such results). As noted above, however, there is no one preferred type of analysis, and there is a role for both modelling and accounting approaches as well as more practical "current-analytical" approaches to build common understanding.

The case studies showed that the motivations underlying subsidies are generally such (*e.g.*, sectoral promotion, job growth) that preferences can be clustered in a broad range of mutually reinforcing incentives to favour certain sectors, regions or activities. This has numerous implications for this agenda and analysis. First it emphasizes that subsidies removal alone, especially when environmental impacts are induced, may be necessary – but not sufficient – to realize a significant change in sectoral behaviour and thus environmental impact. The link of environmental impact to subsidies removal will necessarily depend on the weight of subsidies in the package of preferences.

d) The case studies also showed that *subsidy reform did not tend to proceed in isolation of other changes in policy, pricing, and programmes*. Most governments took a holistic approach to the reforms being proposed. This showed up in a broad set of partnerships and alignment of agendas that were mobilized, and

again emphasizes the need for strong political and bureaucratic leadership including among different ministries and orders of government.

e) Thus effective public governance and policy coherence are both critical aspects of successful environmental outcomes from subsidy reform, and to understanding the political economy of subsidies reform. Most critical is creativity in involving diverse stakeholders and other decision makers in the reform efforts.

f) *Entitlement mentalities develop quickly and can hamper subsidies reform*. This can have implications for use of transition measures and short term adjustment, including broader demonstration or equity effects for others facing structural reform. Thus there is an open debate on how to handle transitions in subsidy and associated structural reform. It was widely acknowledged that subsidies can hamper structural reform and adaptive management. However, transition management is a critical part of reform. Over-attention to comparative statics and insufficient attention to transitions may hamper reform results. In this context, the workshop discussed the importance of signals – political and otherwise – and the potential harm of not sticking to established timetables that had influenced economic and other decisions.

Unresolved debate

There were some aspects of the workshop for which debate did not lead to a convergence of views.

First is the issue of the role for, and evaluation of, environmentally-motivated subsidies (subsidies for environmental goods). Even the definition of this category of subsidies was difficult to reconcile (simple inducements to environmentally responsive behaviour? or accelerated adoption of environmentally beneficial technologies etc that would not otherwise have occurred?). The discussion tended to dismiss these kinds of subsidies as non-problematic – possibly overly generously, as issues were also raised in relation to policy efficiency, definition, expectations, impacts on adaptive management and the like.

Second was a debate on the need and role for common definitions and data on subsidies across countries, and the role this played in the reform agenda. Those participants most interested in multilateral levers for reform (*e.g.*, WTO rules) tended to insist on this as first priority, and lack of progress in this area as an impediment to reform. Others argued that reform needed in domestic contexts can proceed apace without such a step, although domestically relevant analysis is certainly needed (either way, some data collection and definitions are necessary to assist transparency). Although this workshop focussed more on the political economy of reform itself, and not on multilateral issues of data collection and comparability such as might have been the case earlier in the project, the discussion sometimes mired in this debate. It was difficult to discern whether this simply represented the nature of the experts in attendance, as opposed to a critical aspect of the momentum for subsidies reform. The likely message is that both reform and analysis need to continue on a parallel track.

Third was a related undercurrent to the discussions of whether subsidies reform requires multilateral rules to force reform, in relation to other drivers. A related discussion also took place on the likelihood of successful proactive reform. This manifest itself, in part, in discussions on the experts and topics most appropriate to future

workshops on subsidies reform in the environmental context (*i.e.* trade officials should attend to gather information on the environmental harm of subsidies as ammunition to strong rules (as drivers of reform), versus an desire to continue to share experiences on how to implement subsidies reform). It is the opinion of this Chair that the normative work may have run its course for the moment and – just like the policy development cycle itself – that which follows the data gathering and analytical stage is naturally a focus on how decisions should be successfully implemented.

Last, I would draw attention to the debate on the role of consultations. On the whole it tended to be agreed that consultation – including with potential "losers from reform" was essential – not only to attempt to build buy-in to change and understand impacts that need to be managed, but also to ensure that reform processes are broadly perceived as fair and legitimate/transparent. However, the view was not universal, and there were arguments that such inclusiveness merely enables rent-seeking behaviour and potentially slows reform relative to a more closed approach.

Conclusions

In conclusion, it was increasingly clear in this workshop that when talking about implementation of reforms, the environmentally harmful subsidies agenda is one that is cross-cutting and requires an interdisciplinary approach – similar to that of sustainable development itself. There is an underlying tension with this and traditional approaches on environmentally harmful subsidies that have been driven in large part by environmental and trade proponents. These aspects remain critical to the debate, but the project – if it is to focus on the implementation phase of subsidies reform – must now mature into a broader set of interdisciplinary discussions and issues, including building on the skills of those who can share best practices in decision-making and governance.

It is recommended that a fourth workshop continue to focus on the political economy of reform, but perhaps there may be room for focus on particular aspects of that challenge. In any case, case studies should be carefully managed in order to ensure that they are comparable in the manner in which they address the topics, in order to ensure that the greatest possible contribution can be made from them. The case studies presented in this workshop, along with the efforts of other participants and presenters, have already made a major contribution to our understanding of the challenges of removing environmentally harmful subsidies, and how to ensure we move into that coveted win-win-win box of economic, environmental and social sustainability and resilience. I was pleased to take part in these discussions.

Discussant Remarks

Scott Vaughan

Organisation of American States

I will make a few observations from some of the presentations and discussions heard during the course of this workshop on subsidy reform. Let me begin by noting the observation of Vangelis Vitalis of New Zealand of the importance of bringing the issue of environmentally-damaging subsidies to international trade negotiations. While trade policy is not the sole policy lever capable of reducing subsidies, Mr. Vitalis and others have made a strong case that trade rules can be extremely effective in bringing rules to bear in reducing a wide range of subsidies, including those that are shown to be environmentally-damaging. Mr. Vitalis also hinted that making the environmental argument in favour of reducing or eliminating subsidies is neither automatic nor easy. Instead, so-called "win-win" outcomes require rigorous, objective, well-focused and relevant analysis.

Negotiations underway since the launching of the World Trade Organisation (WTO) Doha round related to identifying and reducing environmentally-damaging subsidies to the fisheries sector remain the best example of potential win-win outcomes. Organisations such as the International Institute for Sustainable Development (IISD), the WWF, the OECD, the United Nations Environment Program (UNEP) and others have played a pivotal role in establishing a strong and focused analytical framework within which to push subsidy reduction in the WTO.

One obvious policy question from the fisheries example is: why are not seeing a similar degree of progress underway in sectors outside of fisheries. For the past decade or more, work has continued on identifying environmentally harmful subsidies in a number of sectors, notably agriculture, as well as energy and transportation.

One possible explanation may be the following specific set of circumstances in the fisheries sector which does not seem to be easily transferred to other sectors:

- an unambiguous crisis related to the collapse and/or severe depletion of the global fisheries stocks have been established clearly by scientific bodies;
- the direct contribution which subsidies makes to these crises;
- since well before the Doha Round was launched, work was underway in identifying the specific role that trade rules – particularly in the WTO Agreement on Subsidies and Countervailing Measures context – can play in alleviating pressure transmitted through subsidy payments.

- although less clear, there is some agreement about the technical definition or parameters of different kinds of subsidies in the fisheries sector, which enables the trade policy option to be examined.

It is important to note that almost everyone accepts that reducing subsidies is not in itself the sole precondition towards establishing sustainable fisheries management practices. However, it is nearly impossible to advance in this area with the persistence of price distorting subsidies.

Based on the fisheries example, the challenge for the environmental community is identify opportunities in other areas. From a political economy perspective, I would suggest that the existence of a clear and documented crisis which is magnified by the existence of subsidies may be the most important components towards progress. There are three that are worth thinking about in the future:

- First, public health. One specific and obvious example is in the energy sector, and the effects of subsidies to support the use of coal for electricity generation. There are various studies from the public health sector which quantify the economic cost equivalent of human health costs arising from the use of coal-fired electric power plants and their substantial contribution to N0x, S0x and mercury emissions. These studies tend to show that the economic costs directly-related to respiratory diseases, premature deaths, lost productivity, material damages run into tens of millions. An interesting contribution by the OECD and the work on sustainable development would be to compare what is known about the total value of subsidies (and actions which have a similar price effect as subsidies, such as grand-fathering emission regulations) with the existing economic quantification of human health costs from coal-fired electric generating plants. Together, this would provide a kind of double-count towards the total cost of subsidies in that particular area.

- Second, climate change. It is clear that the scientific consensus noted above around the depth of crisis in the fisheries sector is not fully matched to date in the climate change debate. However, the last report of the Intergovernmental Panel on Climate Change set out some ominous future scenarios, including of course an expected increase in the frequency and severity of extreme weather events, such as hurricanes, drought and tropical storms. Several recent articles, including one reported in the US National Academy of Sciences, suggests that the frequency of Category Three and above hurricanes originating in the Atlantic Basin has increased, and that one driver of these changes may be linked to climate change. These scenarios may provide fresh impetus to examine the labyrinth of direct subsidy payments, and indirect measures like tax deferrals or other kinds of breaks, which have similar effects on the price of fossil fuels.

- Third, developmental issues. It is clear that subsidies in such key sectors as agriculture have a substantially negative on developing countries. Given that agriculture comprises 40 to 60% or more of the total labour force in many developing countries, farm subsidy payments applied in OECD countries have a direct and negative impact on the income potential of literally millions of farmers in developing countries.

A recent study for the World Bank finds that nearly two-thirds of the total economic gains that would accrue from reducing or eliminating all merchandise trade barriers and farm subsidies globally would come from agriculture. Based on a modelling exercise, the

report concludes that the total welfare gains from the full implementation of the Doha round in the agricultural sector would be US$151 billion per year. It is important to note that by far the greatest welfare gains in the agricultural sector, according to the report, arise from a substantial reduction and elimination in tariffs and related market access commitments, and the remaining 7% arise from reducing domestic support and export subsidies in the agricultural sector.

Allow me to comment briefly on two papers presented at the workshop. First, let me commend Roland Pittar for the example of subsidy payments in the water sector. From a political economy perspective, there are few public policy issues more controversial in Latin American countries than proposing pricing reforms in the water sector, including proposing to replace the current structures of tariff and subsidy payments with some notion of marginal cost pricing and full-cost recovery. Such proposals to reform the water sector are generally caricatured as a move towards privatisation, and have sparked massive and often violent public demonstrations in Bolivia and Ecuador – contributing to the overthrow of governments in both countries – as well as demonstrations in Nicaragua and Buenos Aries, and political controversy in a number of other countries, including Mexico.

One particular kind of subsidy issue that would benefit from additional analysis by the OECD is the environmental effects of subsidies applied to irrigation. An estimated 70% of the water consumed worldwide, including water diverted from rivers or pumped from groundwater aquifers, is used for irrigation. Averages are lower in OECD countries, but still are substantial - between 30-40% of total water at the aggregate level.

Although it remains difficult to obtain information on the extent of irrigation subsidies, in general, they contribute directly to the substantial under-pricing of water, and indirectly to pricing distortions in the agricultural sector. In many countries, the under-pricing of water contributes directly to the water crisis, in which water is traditionally regarded as public good, thereby frustrating efforts towards price formation and related efficiency gains. Put more bluntly, subsidies cause people to use more water less efficiently, and make efforts to increase conservation almost meaningless.

As noted, it is difficult to obtain a clear idea of the extent of irrigation subsidies. The US General Accounting Office estimates that roughly US$2.2 billion is spent each year in that country on irrigation subsidies. However, it is certain that the actual amount of irrigation subsidies extended through state and other levels increases that amount substantially. For example, some estimates suggest that the subsidy equivalent provided to California's agricultural production, by providing below market water rates, is roughly US$6.6 billion per year, and that the entire water subsidy provided to the US farm sector is in the range of US$21.5 billion to $26 billion per year.

Given the difficulty in calculating the extent of irrigation subsidies, an alternative or complementary measure involves estimating the total fiscal burden of the irrigation sector: as a general measure, in most countries anywhere between 60 to 80% of total irrigation costs are never recovered.

The environmental effects of irrigation systems are complex: clearly, irrigation has been a driving force in the Green Revolution, and has been an important contributor to food security. At the same time, the severe under-pricing of irrigation tariffs has contributed to the massive over-pumping of both surface and groundwater bodies in many countries, and a corresponding depletion of water-tables. Where irrigation is applied to support a shift towards higher-value added, export intensive crops like fruit and

vegetables (in addition to low-value crops like soy), then environmental issues include the draining of wetlands; the destruction of fish spawning areas; spikes in non-point pollution sources, in particular, the prevalence of nitrogen, phosphorus and potassium-based contamination, as well as herbicides and pesticide run-off, in areas that are heavily irrigated.

For groundwater aquifers, which are often a source of irrigation draws, then there is the double crisis – particularly in semi-arid regions – where depletion rates exceed replenishment, while the flushing mechanisms for contaminants are slower than surface waters, thus increasing pollution problems in aquifers.

Finally, the presentation by Dr. Larsson regarding Sweden's environmental accounts is extremely useful, in helping to quantify within national accounts the environmental implication of subsidies. A great deal of progress continues in the area of environmental accounting, led in no small measure by David Pearce, who died suddenly and tragically in mid-2005. The idea behind his work remained simple: *the cause of environmental degradation is under-pricing*.

A recent study led by Kirk Hamilton of the World Bank, released in September at the UN Summit meeting for the Millennium Development Goals – entitled *Where is the Wealth of Nations: Measuring Capital in the Twenty-First Century* – is very useful in providing a snapshot of the state of the art of environmental accounting. That report concludes:

- while accounts exist in a growing number of countries, they remain underutilized, especially in developing countries;
- few countries have comprehensive environmental accounts;
- the comparability of national accounts is difficult due to differences in methodology (work by UNEP has been especially useful here);
- accounts to measure trans-boundary movements of pollutants are still distant.

Part I

Frameworks for Measuring and Assessing Subsidies

Chapter 1. Overview of Approaches for Assessing Subsidies

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Introduction

Available data indicate that subsidies are pervasive throughout OECD countries and worldwide. Every year, OECD countries transfer at least USD 400 billion to different economic sectors. Much of this support is potentially environmentally harmful. Subsidies distort prices and resource allocation decisions, altering the pattern of production and consumption in an economy. As a result, subsidies can have negative effects on the environment that are unforeseen, undervalued or ignored in the policy process. For example, fuel tax rebates and low energy prices stimulate the use of fossil fuels and greenhouse gas emissions and subsidies for road transport increase congestion and pollution. Agricultural subsidies can lead to the overuse of pesticides and fertilizers, and in fisheries to the overexploitation of fish stocks.

Not all subsidies, however, are bad for the environment. Some are used to correct specific market failures, such as in the case of some transport modes and water infrastructure. Some are used to generate environmental benefits, such as the payments to farmers to plant trees to reduce agricultural run-off or maintain ecosystems. Yet even apparently benign subsidies can have effects that are difficult to discern in the policy milieu. The policy challenge in addressing subsidy reform is to disentangle the myriad effects on the economy, society and the environment that are generated by the provision of subsidies. Subsidies are often inefficient, expensive, socially inequitable and environmentally harmful, imposing a burden on government budgets and taxpayers — all strong arguments for reforming the existing subsidy policies. Decoupling subsidies from input use, production and consumption would yield economic, environmental and social benefits.

Defining and measuring subsidies

At this stage, there is no definition of a subsidy that is universally accepted by all who use the term — national account statisticians, trade negotiators, environmental economists and the general public. It should be noted that several terms are often used to describe the monetary transfers that result from policies: subsidies, support, assistance, and aid. The terms "support" in the case of agriculture and "financial transfers" in the case of fisheries are used to describe those monetary transfers. In general, a subsidy is a result of a government action that confers an advantage on consumers or producers, in order to supplement their income or lower their costs. The WTO definition of a subsidy under the Agreement on Subsidies and Countervailing Measures (ASCM) currently

serves as the only internationally agreed legal definition of a subsidy and is the starting point for many of the sectoral definitions used in practice. However, the more detailed definitions differ between sectors and, sometimes, between countries, organisations and analysts for given sectors.

Moreover, the ASCM is an instrument of international trade law and, as such, may be unduly restrictive in terms of defining all subsidies which may be environmentally harmful. Three issues stand out as requiring further attention: market price support; government-provided general infrastructure; and the treatment of uninternalised externalities. Including market price support in the form of border protection enables calculation of producer and consumer support estimates, which integrates budgetary transfers and market price support into a holistic measure of support. There is now agreement among many economists that the concept of subsidy — or at least "support" or "assistance" — includes the effects of border protection. Similarly, the government provision of industry-specific infrastructure at less than full cost is considered a subsidy in the ASCM but has never been tested in the WTO. Finally, the issue of uninternalised externalities is a grey area and is treated differently in different sectors. It is particularly important in the transport sector where the generally accepted definition of subsidy includes the support that is provided as a result of failing to fully charge for the marginal social cost of using particular modes of transport (mainly road and air transport).

A key step in ensuring continued progress in the measurement of subsidies is the adoption of a common reporting framework to improve consistency and comparability across countries and to increase the transparency of subsidy data at national and international levels. The OECD's stocktaking of sectoral support identified five main approaches to subsidy measurement, some of which overlap:

- Programme aggregation: adding up the budgetary transfers of relevant government programmes; in most cases data are at the national rather than the sub-national level.
- Price-gap: measuring the difference between the world and domestic market prices of the product in question.
- Producer/consumer support estimate: measuring the budgetary transfers and price gaps under relevant government programmes affecting production and consumption alike.
- Resource rent: measuring the resource rent foregone for natural resources.
- Marginal social cost: measuring the difference between the price actually charged and the marginal social cost.

The significant differences between sectors and countries with respect to the depth and robustness of subsidy measurement raise a number of issues for the analysis of environmentally harmful subsidies. There remain important differences that may limit the degree to which economy-wide data on subsidies can be prepared from sectoral accounts. These disparities relate to coverage, systems of classification, and measurement methods. Determining where the significant differences exist is often hampered by inadequate documentation of assumptions, methods and data. Improvement of documentation would facilitate comparisons and peer review.

Another potential source of subsidy measurement is the WTO subsidy notifications. While the WTO provides the only internationally agreed definition of a subsidy, the level and quality of reporting on subsidy programmes is relatively poor. This emerged from a

review by the OECD of WTO subsidy notifications for a number of sectors. Except for obviously politically sensitive sectors (such as agriculture), there is a high degree of variation in the level of detail provided in the notifications.

Taking stock of OECD subsidy data

Every year OECD member countries transfer at least USD 400 billion to various economic sectors (**Table 1**). According to the data held by the OECD, the bulk of the support provided in OECD countries goes to the agriculture sector. In 2002, the total support estimate for agriculture amounted to USD 318 billion, which represents about 1.2% of GDP in OECD countries. Of that total, USD 235 billion goes to producers. Financial transfers to fisheries appear very small in comparison at around USD 6 billion a year, yet are equivalent to around 20% of the value of landings. Support for European road and rail transport amounted to about USD 40 billion in 1998. In the case of the energy sector, it is estimated that subsidies to energy producers in OECD countries are around USD 20-30 billion a year. Data on support to the manufacturing sector are very dated, with the last available figures being an estimate of USD 44 billion in 1993, although more recent data are available for the shipbuilding and steel sectors.

It should be noted that methodological and data constraints severely limit comparisons across sectors. Although OECD work highlights agriculture as the sector with the largest support in absolute terms, it is likely that support is underestimated for other sectors. The data coverage is also relatively patchy. Agriculture has the most comprehensive estimates of support as a result of the extensive annual PSE exercise. Fisheries financial transfers are also collected annually, but there are gaps in the information gathered (especially with reference to tax relief, regional and local subsidies and national data for a few countries), making in-depth analysis of the data difficult. Data for the energy sector is restricted to subsidies provided to coal production while subsidy data in the transport sector is largely confined to the European road and rail transport sectors. The coverage of other sectors, such as manufacturing, forestry, water, is quite poor, with the exception of the shipbuilding and steel sectors.

Where to next on subsidy data?

The OECD has made significant progress in the measurement and analysis of subsidies for sectors such as agriculture, coal production and fisheries over the past twenty years. However, much remains to be done. Factors contributing to the relatively modest progress in measuring support for the other sectors range from complex methodological and data issues to a lack of political will to compile reliable and internationally comparable subsidy figures. Trade-offs are made both at national and international levels as data collection is often resource intensive and aggregate estimates of support are only as good as the underlying data.

The review of subsidy data definitions, measurement and estimates has highlighted a number of key areas for future work. Pursuit of these lines of research would significantly enhance the ability to identify the range of subsidies that may be potentially environmentally harmful and would make a valuable contribution to the transparent and systematic policy analysis of such subsidies. The key areas identified in the study are to:

- Continue work on subsidy data collection, improving methodologies and consistency across sectors and countries.

- Extend subsidy data collection efforts to cover those sectors where environmentally harmful subsidies are likely to be important (for example, energy, mining, forestry, aviation and manufacturing) and where current data are inadequate.
- Adopt a common reporting framework to help systematise data collection, reporting and transparency.
- Improve the publicly available documentation of subsidy programmes, data and methodologies.
- Undertake peer reviews of subsidy data and methodologies across disciplines, sectors and institutions.
- Encourage greater transparency and clarity of budget documents at national levels.

Table 1. **Subsidies in OECD countries**

	Billion USD 1990	Most recent data [year]	Coverage	Comments
Agriculture	351	318 [2002]	Total support estimate; includes market price support, budgetary payments and support for general services; covers all OECD countries.	Equivalent to 1.2% of GDP.
Transport (road and rail)		40 [1998]	Subsidies estimated as the difference between total revenues and total social costs; includes the European Union, Hungary and Switzerland.	Nash *et al.* (2002) estimated that revenues cover on average 36% of rail system costs.
Energy production	n.a.	20-30 [1999]	Aggregate estimate.	
of which - Coal production	11	5 [2000]	Includes market price support, budgetary payments and support for general services; includes France, Germany, Japan, Spain, Turkey and UK.	Equivalent to USD 68 per tonne of coal produced.
Manufacturing	44 [1993] *49 [1992]*	*22 [EU]*	Net government expenditures to industry. Figures in *italics* cover the EU only and include grants, interest subsidies, tax exemptions, equity participation, soft loans, tax deferrals and loan guarantees, converted into cash grant equivalents.	Figures in *italics* from the EU State Aid Survey.
Of which - Shipbuilding	.. *2.5 [1995]*	0.75 [2000] *1 [2000]*	Figures in italics cover the EU only and include grants, interest subsidies, tax exemptions, equity participation, soft loans, tax deferrals and loan guarantees, converted into cash grant equivalents	Figures in *italics* from the EU State Aid Survey.
- Steel	*2.2 [1995]*	*- [2000]*	Includes grants, interest subsidies, tax exemptions, equity participation, soft loans, tax deferrals and loan guarantees, converted into cash grant equivalents; EU only.	Figures from EU State Aid Survey.
Fisheries	n.a. *[6.8 in 1996]*	6.3 [2003]	Government financial transfers to the marine capture fisheries; includes direct payments, cost-reducing transfers and general services. The 1999 figure excludes Australia, Belgium, Mexico, the Netherlands, Poland and Turkey	Equivalent to 20% of landed value.
Water	..	10	Aggregate estimate.	
Forestry	..	6	Aggregate estimate; includes only Canada and the United States.	

Note: Data and calculation methods not comparable across sectors.

Source: OECD (2005).

Assessment of environmentally harmful subsidies

Determining the environmental impact of subsidies is a major challenge as the environment is affected by all production and consumption activities, which are accentuated or attenuated by policies. In general, a subsidy is harmful to the environment if it leads to higher levels of waste and emissions, including those in the earlier stages of production and consumption, than what would be the case without the support measure.

This includes higher levels of resource extraction than is socially optimal as well as impacts on biodiversity. Removing the subsidy would result in an improvement in environmental outcomes, as the benefits from removing the subsidy would be expected to exceed the cost of removing the subsidy.

There is a need to distinguish between what governments can change, such as support policies and, to some extent, the emergence and use of cleaner technologies; and what they cannot influence, including the dose-response relationship between particular emissions and environmental quality. The environmental impact of support measures result from complex mechanisms that are far from being fully elucidated. Subsidies can have direct and indirect effects and there is not necessarily a direct linkage between the volume and nature of the subsidy and the environmental impact.

This analysis highlights the complexity of the linkages between support measures and environmental impacts. Existing studies on the environmental impacts of subsidies use different models, assumptions and data, and consequently the estimates are not directly comparable. However, they do give a good indication of the range of findings available from different studies on removing support in different countries, with different assumptions and timescales. All studies show that removing support will have a positive effect on the environment, although sometimes the effect may be quite small. In particular, decoupling subsidies from input use, production and consumption would bring economic, environmental and social benefits.

Ideally, decision makers should have access to a thorough economic, social and environmental assessment of these linkages and the impacts of subsidies based on a complex set of general equilibrium analyses (to evaluate the dynamic effects of policy changes on the economy) and environmental impact evaluation techniques. In practice, the environmental impacts of subsidies are usually estimated with a partial or general equilibrium model, and the results are typically highly sensitive both to the model chosen and to the magnitude of the subsidies data used as model inputs. An exhaustive analytical approach, however, is not always possible due to technical and resource constraints and it is generally necessary to adopt a more pragmatic and simplified approach, such as the checklist approach discussed in the next section.

A checklist approach to assessing subsidies

The OECD has developed a checklist that will assist governments and analysts in identifying those subsidies whose removal would benefit the environment. The checklist focuses on two interrelated issues: the effects of subsidy removal on the decisions of consumers and producers; and the linkages between those decisions and the environment. The checklist process is then used to assess the key policy filters that are in place to ameliorate the environmental effects of particular subsides, the conditionality of the subsidy and the extent of technology lock-in that might result from imposition of the subsidy. The checklist can be used as a first-order "quick scan" to determine if removal of a subsidy will result in environmental improvements and to provide a ranking of subsidies in terms of their environmental harmfulness. This will assist in identifying the subsidy programmes that should be subjected to further detailed analysis.

The checklist focuses on two interrelated issues: the effects of subsidy removal on the decisions of consumers and producers; and the linkages between those decisions and the environment. A schematic of the checklist is provided in **Chart 1**.

The checklist highlights the role of "policy filters" in terms of environmental management regimes in defining the environmental impacts of subsidies. If, for example, subsidies to fisheries are removed while the fish catch is limited by other measures, the effects of the subsidy removal may not be as significant as if there were no constraints on catch (as occurs in an open access fishery). Similarly, if fossil fuel subsidies for a particular transport mode are removed while infrastructure is a limiting factor in the ability of consumers or producers to switch to alternative modes of transport, the environmental effects of subsidy removal may not be significant.

At the same time, it is important to distinguish between those policy filters that are in place for the purposes of environmental management and those that have been imposed in response to environmental problems introduced as a result of the subsidy. The latter set of policy measures can be claimed to offset the environmental effects of the subsidy, but they would not be necessary if the subsidy programme had not been introduced. The mix of policies and the rationale for particular filters are therefore quite significant considerations in this stage of the checklist.

The checklist recognises the potentially important effect that subsidies have on the innovation and uptake of technologies that may be more environmentally beneficial than currently exist, particularly over the long term. The checklist is based on the assumption that, in the short-run, subsidies that reduce variable costs (such as energy and materials, including water) are more likely to impact on production (and thus emissions) than subsidies that lower fixed costs. The environmental harm of these subsidies is aggravated if they delay the development and dissemination of new technologies that increase resource productivity while cutting back on environmentally harmful effects. Other subsidies likely to have an environmentally harmful effect are those that lower the cost of access to natural resources, and capital subsidies that impede or thwart technological change, locking in potentially less efficient uses of energy and other materials.

The third key element of the checklist refers to the conditionality of the subsidy. Subsidies are always conditional on something. This could relate to the level of production, the use of particular inputs, and the introduction of a mandated technology, undertaking specific research and development or even to undertake an unspecified level of activity in a sector. Subsidies that are conditional on output have tended to attract the most policy attention, particularly in relation to market price support for agriculture, coal and manufacturing (steel and shipbuilding).

Key findings from sectoral analyses

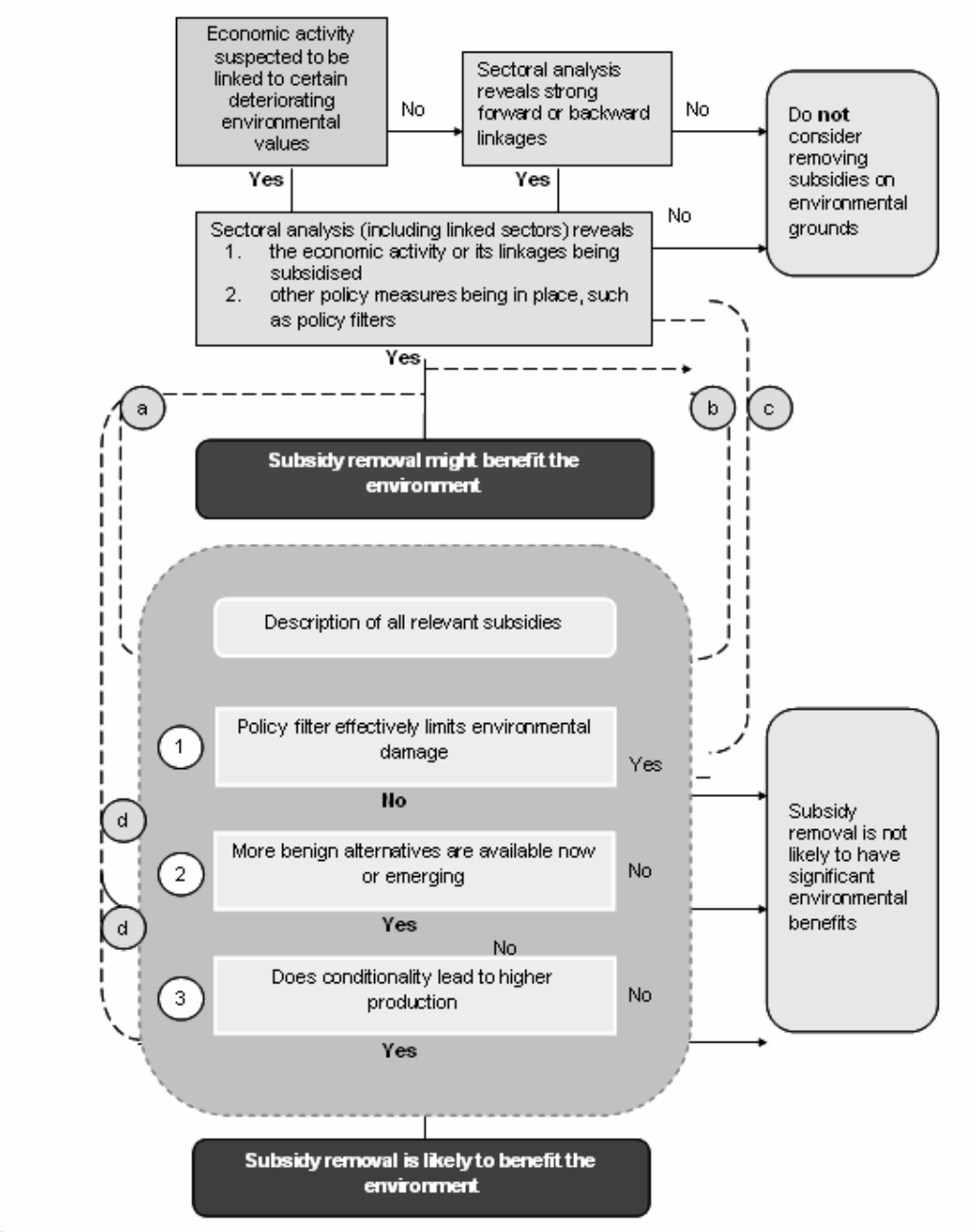
The checklist was applied to a number of sectors in order to assess its implementation as a policy tool and to identify areas for future work to refine and apply the methodology. The sectors were agriculture, fisheries, transport, energy, and water. The choice of sectors partly reflected the depth of existing analysis on subsides that was *available* and the policy priorities attached to subsidy reform in the sectors. The key finding from the cross-sectoral analyses was that there is significant scope for reducing environmentally harmful subsidies in most of the sectors.

In the case of agriculture, analytical work on agricultural support measures identified market price support, payments based on output, and input subsidies as potentially more harmful than other types of support measures. Such transfers account for around 76% of the total support to the sector in OECD countries. On the other hand, payments based on

area planted and animal numbers, and based on input constraints, were seen as potentially most environmentally effective.

For fisheries, the effects of subsidy reform depend critically on the management system in place and the effectiveness with which the management is enforced. Management regimes employing market-based incentives tend to be more effective in ensuring fishers have an incentive to conserve fish stocks, provided they are well-enforced. Transfers to the fishing sector which encourage capacity and effort expansion by reducing the costs of vessels and inputs tend to be the most potentially environmentally harmful.

Chart 1. **Flow chart of the checklist**



The net effects of removing subsidies to public passenger transport and rail freight are likely to be negative for the environment. Their removal is likely to increase the use of more environmentally harmful modes of transport, while having social consequences that also need to be addressed. In contrast, removing or reducing the support provided to private passenger transport, road haulage and air transport has the potential to provide environmental benefits. This would involve charging users for the external costs that they

incur, although there are technological, political, and institutional obstacles to be overcome in doing so.

Reform of subsidies to the energy sector should focus on support provided to the use of fossil fuels, particularly coal and oil. Support to the increased use of these fuels poses greater threats to the environment than, say, subsides that support the use of energy-saving devices or the development of renewable energy. At the same time, there are often significant social objectives that need to be considered when assessing energy policy, together with the general equilibrium effects of altered patterns of energy production and consumption that may be generated by subsidy reform.

The potential environmental effects of removing subsidies at the various stages of the water cycle are generally positive, particularly at the early stages of the water cycle. Removing subsidies for water abstraction will decrease water use but may reduce investment in infrastructure. Proper pricing of water to end-users will improve price signals and encourage increased efficiency in water use. However, as with energy and transport, there are social and public health considerations to be taken into account. Adverse environmental effects may result from removal of subsidies to waste water collection and treatment.

Overcoming obstacles to the reform of subsidies

Reform of environmentally harmful subsidies offers the prospect of a "win-win" outcome for both the economy and the environment. Not only are many subsidies economically wasteful and environmentally damaging, but they may also be counterproductive and fail to meet their stated objectives. For example, subsidies to agriculture induce higher production, which in turn lowers commodity prices, leading to demands for increased support for the sector in more countries. Yet many governments around the world have been reluctant to dismantle harmful subsidies, despite growing environmental awareness and pressures on government budgets.

What inhibits subsidy reform?

Since government policies are ultimately a consequence of political choices, it is necessary to examine the political incentives and motives of policy makers in order to better understand the obstacles to the reform of environmentally harmful subsidies and how to overcome them.

Lack of political will to undertake reform of environmentally harmful subsidies is linked to the *strength of special interests* and the role of rent-seeking in gaining and retaining subsidies. The benefits of subsidies tend to be highly concentrated in the hands of specific groups rendering lobbying highly profitable for these groups. However, the financial burden of supplying these benefits and the environmental damage caused are widely diffused across society at large. Hence, there is little countervailing lobbying pressure, or electoral pressure, for the elimination of these harmful subsidies. Political resistance to these subsidies is made even more difficult since the environmental consequences are usually less visible, emerge with a time lag, and hence are harder to attribute to a specific policy concession.

Thus, demonstrating the economic and environmental costs of subsidies is difficult, whereas beneficiaries can more easily provide concrete anecdotes of the direct social benefits (for example, employment, regional growth), while ignoring most of the indirect

effects and costs. This divergence between the concentration of benefits and costs increases the expected returns available to specific groups and increases the incentive to undertake lobbying to attract and retain subsidies. Empirical evidence suggests that older and declining industries, which are more environmentally damaging, tend to secure most support and trade protection.

Special interests have proved adept at perpetuating *false perceptions and fear of change* by successfully invoked "mythologies and mantras" in order to gain popular and political support for the subsidies they receive. For example, subsidies have sometimes been justified by the need to maintain ideals of pre-industrial fishing and farming families. However, even when such ideals may reflect legitimate aspirations, subsidies are not necessarily the most effective means of attaining them, particularly if they have adverse effects on the environment and other aspects of trade and the economy.

The political system has also been observed to generate a degree of policy convergence in relation to support policies. In this process, politicians seek to gain the middle ground on policies in order to insulate themselves from voter preferences and to minimise and sharpen the differences between political parties on certain policy issues. Sometimes, policies may converge around the maintenance of subsidy programmes, while, in other cases, they may converge around a consensus for subsidy reform. The latter was the case in Sweden where there was a general groundswell of support for agricultural policy reform, including the reduction of agricultural subsidies.

Concerns over industry competitiveness and income distribution are often cited by policy makers as being major obstacles to subsidy reform, particularly with respect to regional interests. Despite there being demonstrable benefits from unilateral subsidy reform, there is a reluctance to undertake such a process unless forced to by either economic or environmental crisis, or in response to external pressures (such as might occur through new multilateral or regional trade agreements). Similarly, distributional concerns (including concerns over regional interests) can inhibit moves to reform subsidy programmes as, inevitably, the removal of a subsidy will generate some losers from the policy change. In this regard, there is scope for learning the lessons from experiences with other policy reforms (such as increases in environmental taxes, privatisation of state-owned enterprises, tariff reform).

A lack of transparency often contributes to the difficulty of generating pressure for subsidy reform. Transparency in this case refers to information on the size of subsidy programmes, the beneficiaries of the subsidies, and the economic, environmental and social effects of subsidies. Asymmetries in the review process for environmental and economic measures can also reduce transparency. Most environmental measures are subject to a regulatory impact assessment while, in many countries, the introduction of economic policies (such as subsidy programmes) is not subject to an environmental impact assessment process. The shift towards incorporating sustainable development paradigm into the policy agenda has taken OECD countries some way down that path but, despite some progress, there is much yet to be gained by better integrating economic, social and environmental considerations into policy assessment and decision-making.

There may also be legal, administrative or technological constraints to policy reform. Such constraints can result from structural rigidities which restrict the ability of society to adapt to changes in subsidy policy. For example, restrictions on the sale, amalgamation or sub-division of farming land in some countries may restrict the ability of farmers to efficiently alter their farming practices (some of which may be environmentally harmful) in response to changes in subsidy policy. Constraints can also result from technological

factors, as in the case of transport where the introduction of electronic charges based on marginal costs for passenger cars is impeded by the huge cost and technological challenges involved.

Finally, it is observed that the long-term provision of subsidies generates a perception of "entitlement" that may be hard to break. It is well recognised that subsidies become capitalised into the prices of factors of production (for example, in the value of land, fishing vessels or access quotas). The expectation that subsidy programmes will continue tend to become embedded in the expectations of producers and consumers. This leads to resistance to change and strong incentives to lobby for the retention of subsidy programmes. Subsidies and protection also create incentives for firms to remain inefficient and under-invest in new and more efficient technologies. Such policies therefore create an economically and environmentally damaging culture of subsidy dependence in particular industries.

Under these circumstances policy concessions once introduced will be difficult to eliminate. When an industry commits, or becomes locked in, to a subsidy dependent mode of production, support for the status quo becomes politically attractive for governments. Hence subsidies persist, even when it is clear that they have failed to satisfy their intended objectives and may even be counterproductive

Opportunities for reform

Existing studies tend to be stronger at highlighting the obstacles to subsidy policy reform than in specifying the mechanisms that can be used to deliver reform. The relationship between subsidy reform and political pressures is complex and depends greatly upon the specific economic and political climate in each country. The effect of subsidy reforms will also vary greatly across any given sector. As a result, there is unlikely to be a single set of strategies that would work across all sectors, in all countries. Nevertheless, it is appropriate to evaluate the political prospects of some of the more promising reform strategies that have been suggested and tested in the policy world.

The obvious implication from analysis of the obstacles to subsidy reform is that policies which curtail the political (lobbying) power of sectoral interest groups will be most successful in achieving policy reform. However, these are the very policies that will be most strongly resisted by powerful interest groups. Moreover, since political incentives are shaped by institutional and legal factors, which cannot be easily altered in the short run, there is probably not much that can be done in a specific policy context to directly curb the level of rent seeking by special interest groups. Strategies for subsidy reform must therefore take rent-seeking behaviour as a fixture. The problem is therefore one of designing reforms that are politically feasible and do not ignite strong political opposition.

A multi-pronged strategy is required to overcome these obstacles. Challenging the misconceptions surrounding the provision of subsidies to particular sectors will contribute to changing the terms of the policy debate. This will involve clearer articulation of countries' economic and social objectives and a comprehensive identification of the policy options that are available to meet society's objectives. Recognition that a range of options is available to meet societal objectives is also important, as it contributes to a wider acceptance that subsidies are generally inefficient tools for achieving policy goals. The use of innovative policy instruments should be encouraged. A good example of this is the "Bush Tender" scheme being piloted in Australia which uses an auction scheme to

compensate landholders who enter into agreements to provide management services that improve the quality or extent of native vegetation on their land (over and above those management services required by current obligations and legislation).

Better targeting of existing subsidy programmes should help to improve the effectiveness of the programmes and reduce any environmental impact of the subsidies. Improved subsidy design may help improve the efficiency of subsidies in correcting environmental problems (although they will generally remain less efficient than other policy instruments such as pollution taxes or tradable permits, and may violate the polluter pays principle).

There is a need to exploit windows of policy opportunity which may enable governments to undertake reform, rather than waiting for crisis to strike a sector or a country. There are conflicting experiences from among the country examples cited in the study. Some countries' reform programmes were driven by the need to respond to a fiscal or environmental crisis (for example, the case of New Zealand agriculture and fisheries subsidy reform as part of wider economic reforms). In other cases, enlightened self-interest and a confluence of political forces agreeing on the need for change were factors in driving agricultural policy reforms. From a domestic perspective, subsidy reform should be considered within the overall context of the economy. For example, increased competition and the opening up of economies to international forces may reduce the lobbying power of special interest groups and create opportunities for reforming environmentally harmful subsidies. Alternatively, international pressures may provide a singular window of opportunity for subsidy reform. This may be the result of the ongoing negotiations at the WTO on fisheries subsidies disciplines.

A major factor in the push for reform of environmentally harmful subsidies is increased transparency. Improved transparency is required in relation to information about the beneficiaries of subsidies, the economic costs of subsidies, the environmental effects of subsidies and the assessment of the range of policy alternatives to subsidies. Transparency can stimulate voter opposition to subsidies and make subsidy reform less politically damaging for governments. In this regard, identifying who benefits from subsidies and highlighting their relative "bargaining power" can provide a particularly powerful motivating force for change. A good example is agriculture where there has been significant work done on who receives and who benefits from subsidies, both in terms of income levels, farm structures and geographically, and the cost of subsidies to consumers and taxpayers. This has helped to influence decision makers in some countries to reassess and reform subsidy programmes.

It is necessary to remove structural impediments and rigidities in the legal and administrative framework which may inhibit adjustment. This will require a holistic approach to policy reform as such impediments may not always be immediately apparent when designing policy reform packages. It may also involve assessing the administrative and geographical level at which the subsidy is provided.

Finally, it is also important to determine whether transitional measures may help smooth the political process of phasing out or reducing subsidies. Such measures involve not only payment or compensation to assist in structural change, but also the provision of information, advice, retraining and so on. The appropriate speed of adjustment will depend on the resilience of the community to change and external pressures, and on the availability of alternative sources of employment and income. However, care needs to be taken to ensure that transitional measures not become entrenched in the expectations of beneficiaries of the measures.

Conclusions

The major conclusion is that there is significant scope for reforming environmentally harmful subsidies in OECD countries. The checklist is a useful tool for analysing environmentally harmful subsidies with its main appeal being the establishment of a common organising framework that can be applied to different sectors. The checklist provides a core set of questions that are common to all sectors which can be applied in a systematic way to existing and proposed subsidy programmes. It is a policy tool that government agencies and other groups can easily apply in a relatively cost-effective manner. In particular, by avoiding many of the evaluation problems that constrain cost-benefit analysis, it has the potential to be more widely applied by those less well-versed in subsidy analysis, yet with legitimate interest in the reform of subsidies. As such, the checklist helps to highlight those areas in which further detailed empirical analysis is required in assessing the economic, social and environmental effects of subsidy removal.

The variety of sectoral characteristics across countries may mean that different aspects of the checklist will be more important for some sectors and countries than for others. It is also clear that the environmental profiles of industries will differ between and across countries according to the industrial structure and biophysical endowments of countries. However, the checklist provides sufficient flexibility to allow sectoral and national differences to be accommodated within the core set of questions, augmented by country-specific information. On the other hand, the temptation should be resisted to make the checklist so flexible and all-encompassing that it ceases being a useful tool for rigorous analysis.

Improved transparency on both subsidy data and the effects of subsidies is one of the main advantages of the checklist. The value of empirical application would be increased by having the results reviewed internationally and, ideally, subject to some form of monitoring and assessment. The role of transparency in highlighting the environmental effects, as well as the costs and benefits of subsidy programmes is significant in attempting to phase-out environmentally harmful subsidies.

The work carried out in this project represents only the first step towards identifying and assessing subsidies. Three key steps have been identified for future work in this area to continue to contribute to the policy debate:

- Undertake additional case studies at a national, sectoral and individual programme level to obtain further experience in assessing the costs and benefits of subsidies. In this regard, subsidies that are provided by supranational entities (such as the EU) or at sub-federal level (such as occurs in Canada, the United States or Australia) should also be included.
- Improve transparency by increasing the opportunities for experience sharing and learning by doing. This could be done by improving the documentation available on subsidy analysis and by convening more workshops to share information, data, analysis and experiences.
- Ensure that empirical assessment of environmental and social impacts is conducted in conjunction with assessment of the economic (including trade) impacts of subsidy removal.

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Chapter 2. Accounting Approaches for Assessing Subsidies and Taxes

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Introduction

Both environmental taxes and environmentally motivated subsidies are popular economic instruments in Sweden. As more economic instruments go from theory to practice, the need to understand the consequences increases. The Swedish System of Economic and Environmental Accounts (SEEA) is a good tool for doing this, as it can identify the actors or areas the economic instruments affect in the final stages.

The aim of this paper is to present some of the SEEA economic data and show possibilities for using the SEEA to analyze economic policy tools, their efficiency and how they impact the economy. As opposed to a sectoral approach, the SEEA show the total impact on the economy, including un-regulated industries and environmental problems. The combination of economic data and environmental data in an international framework, such as SEEA, is a promising analytic tool.

System of Economic and Environmental Accounting (SEEA)

The SEEA is a satellite system to the System of National Accounts (also referred to as SNA) (United Nations, 2003). SEEA brings together economic and environmental information in a common framework to measure the contribution of the environment to the economy and the impact of the economy on the environment. It provides policy-makers with indicators and descriptive statistics to monitor these interactions as well as a database for strategic planning and policy analysis to identify more sustainable paths of development.

SEEA consist of four categories of accounts:

a) The first considers purely physical data relating to flows of materials and energy and marshals them as far as possible according to the accounting structure of the SNA.

b) The second takes those elements of the existing SNA which are relevant to the management of the environment and shows how environment related transactions can be made more explicit.

c) The third comprises accounts for environmental assets measured in physical and monetary terms.

d) The fourth considers how the existing SNA might be adjusted to account for the impact of the economy on the environment.

The aim of work on environmental accounts at Statistics Sweden is to develop and maintain a system of physical accounts that is linked to the economic activities described in the national accounts. In practice, this means developing a system of environmental and natural resource statistics that can be linked to the industry, product and sector categories used in the national accounts, thus forming a satellite system of accounts around the national accounts.

Definitions

In order to identify the national taxes, subsidies and costs that are of particular importance for the environment, definitions are crucial. In order to make international and national comparisons, common definitions are very important and the work carried out by OECD in the past has been very helpful for the work in the Swedish SEEA.

Environmental taxes

Eurostat (the Statistical Office of the European Communities) and the OECD have elaborated a definition of environmental taxes that has been accepted by the member states, making comparative studies possible between different countries in terms of tax structure, tax base, revenues, etc. According to this definition an environmental tax is: "*A tax whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment*."

According to this definition, it is the tax base that determines whether or not the tax is an environmental tax and not the explicit motivation. The motivation is of minor importance, as a tax on energy, for example, has the same impact on the economy regardless of whether it is motivated by the interests of public finance or by environmental concerns. These taxes are classified into four major categories based on the tax base, namely:

- Energy taxes (including CO2 tax)
- Transport taxes
- Pollution taxes (including SO2 tax)
- Resource taxes (excluding taxes on oil and gas extraction).

Subsidies

There is no universally accepted definition of a subsidy today. Instead, there exist several definitions of what a subsidy is depending on the viewpoint and purpose of the analysis. In the environmental accounts the definition put forward in the European System of Accounts has been the base regarding environmental subsidies. A subsidy is defined by the European System of Accounts (ESA 1995 §4.30) as: *"…current unrequited payments from government to producers with the objective of influencing their levels of production, their prices or the remuneration of the factors of production"*

In this definition of a subsidy, some forms of payments are excluded, for example:

- Capital transfers, such as investment subsidies (D.92)
- Current transfers from the government to households in their role as consumers (D.75)

(D stands for distributive transactions in the system of national accounts. The first number, for example 9, stands for a capital transfer and the number 3 for a subsidy. Together with the second number, each form of capital transfer can be discerned; for example 2, stands for an investment subsidy.)

This definition is one of the narrowest used by economists in that it covers only budgetary payments and only those to producers. This means that, for example, transfers such as investment subsidies or support paid from government to the county administrative boards will not be included.

The definition of a subsidy put forward in the European System of Accounts has been the base for environmental subsidies in the environmental accounts. However, there are many ways to broaden this definition by using other national account data not defined as *subsidy* today in the national accounts. Starting out from the national accounts (SNA) has proved to be a good beginning.

The definition of a subsidy used by the environmental accounts in Sweden begins with the SNA-definition and then includes also other forms of supports such as investment subsidies (labeled capital transfers in SNA) and subsidies paid to households (labeled current transfers in SNA). Sources for these other subsidies, mainly investment subsidies which are not currently possible to identify in the national account, are the different authorities responsible for the specific subsidies as well as the Swedish National Financial Management Authority which delivers data to the national accounts.

Environmental subsidies

An environmental subsidy has the purpose of giving incentives for more environmentally friendly actions. There are mainly two alternatives for a definition of an environmental subsidy.

Denmark uses the definition "In order to be an environmental subsidy, it has to reduce the use of one or more physical units that have a proven specific negative impact on the environment". The OECD, on the other hand, focuses on the subsidy's motive in their database on economic instruments, and therefore names the subsidy "environmentally motivated subsidy". With regard to the difficulty in proving a subsidy's positive environmental effect, the Swedish approach has concentrated on the "environmentally motivated subsidies".

According to the OECD definition, it is the original motive of the subsidy that determines whether or not the subsidy is an environmentally motivated subsidy. Subsidies have been classified into either environmentally motivated or other, through a detailed review of budget proposals for the period from 1991 to 2000 to determine which budget lines have an environmental motive. This is because the national accounts in Sweden distribute the subsidies according to the name of the budget line rather than the precise name of the subsidy. If the budget line gives rise to a specific subsidy with an environmental purpose, it is classified as environmentally motivated. If, for example, regional reasons or cultural reasons have been the main motive for a budget line, it will not be classified as environmentally motivated. Examples are the support for the public procurement of public railways and the grant for investment, management and operation of railways, which are not primarily motivated from environmental motives.

Environmentally motivated subsidies are classified into four categories as are environmental taxes, namely:

- Energy-related subsidies.
- Transport-related subsidies.
- Pollution-reducing subsidies.
- Resource-related subsidies.

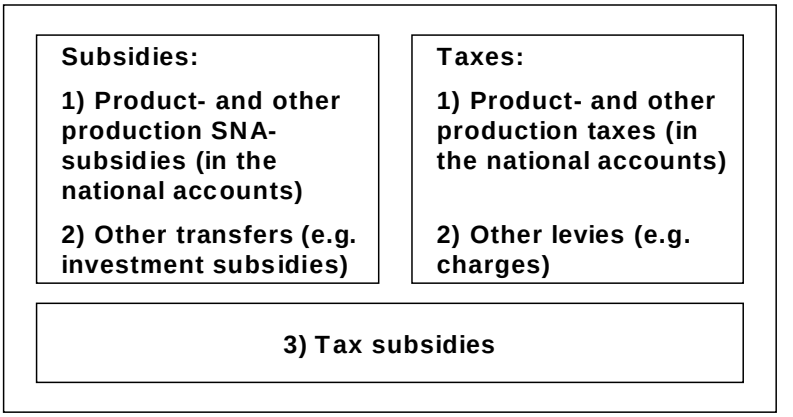
Frameworks for measuring subsidies

Approaching the measurement of subsidies based on an accounting system is one of two enumerated at the OECD (OECD, 2003). The other consists of sectoral subsidy accounts, *i.e.* accounts that relate to a specific industry or sector such as agriculture, fisheries, coal, transport or energy. One reason for the emergence of these sectoral accounts is the limitation in the narrow definition of a subsidy in the national accounts. However, two major limitations of sectoral subsidy accounts are, firstly, that by excluding non-specific subsidies, they leave out general subsidies that may affect the allocation of resources within an economy and, secondly, that the sectoral accounts are put together using different classification systems and therefore provide different results. The environmental accounts approach show the total impact of the economy and therefore also the industries or environmental problems that are not regulated. Therefore the combination of economic data and environmental data in an international framework is a very promising analytic tool.

Taxes and subsidies from the SEEA perspective

Figure 1 illustrates how the different parts of a subsidy and a tax can be covered, from an environmental accounts' (SEEA) perspective. Firstly, *product- and production subsidies/taxes* are collected from the national accounts, who distinguish between subsidies on products and on other production. Other categories of subsidies can be included if there is a need to broaden the concept, such as for example *other transfers* like investment subsidies that is included in the subsidy concept. *Other levies* may be charges. They are not currently reported in the national accounts since the sums remitted are reimbursed to those liable to pay the charge. Both these forms of other transfers and levies are important to follow, since they are important tools used for reaching environmental goals. There are more combinations of and hybrids between taxes and subsidies than one at first notices, such as tax subsidies (also called indirect subsidies), which are clearly pointed out in the figure.

Figure 1. **Subsidies and taxes from an SEEA perspective**



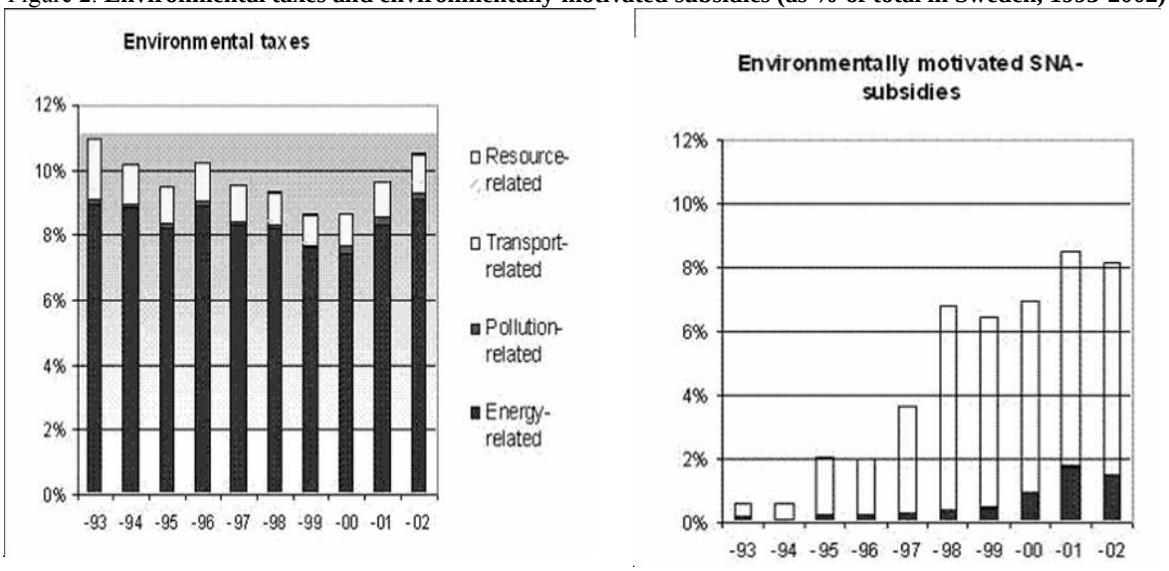
Results and analyses

Today we have a variety of environmental economic data in the Swedish environmental accounts. There is information of for example environmental taxes (together with the total taxes) as well as environmentally motivated subsidies (together with the total subsidies). Also environmental investments and current expenditures are included. The data can be presented individually or together with other data, such as for example emission and energy data. It can therefore show the coverage of the economic instruments by industry in order to follow up the consequences of different economic instruments.

Regarding subsidy data, we currently present two different kinds of environmentally motivated subsidies, environmentally motivated SNA-subsidies and *total* environmentally motivated subsidies. Hopefully this splitting up will not be needed in the future (more than for showing different types of subsidies), but today different sources are used for the collection of subsidy data. In this paper SNA-subsidies indicate that only the subsidies labeled as subsidies in the system of national accounts (SNA) are referred to. The other type of subsidy is environmentally motivated *investment* subsidies. Also the environmentally motivated investment subsidies are included in the national accounts but we have not yet been able to discern them from the other transfers and can not yet distribute them onto industries.

Figure 2 illustrates the Swedish environmental taxes and SNA-subsidies as a percent of the total taxes and SNA-subsidies. The increase in share of environmentally motivated subsidies is a result of two things, an increase in use of environmentally motivated subsidies as a policy tool, as well as a decrease in the total SNA-subsidies.

Figure 2. **Environmental taxes and environmentally motivated subsidies (as % of total in Sweden, 1993-2002)**



Environmental taxes in the environmental accounts

Below, in **Table 1**, the total environmental taxes in Sweden between 1993 and 2004 are presented. Expressed as percentage of GDP the environmental taxes have been close to 3 percent over the whole period, only marginally above the environmental tax percentage of the EU.

In **Figure 3** the CO2 tax by industry is compared to the CO2 emission by industry. It can here be observed that private consumption, the land transport industry (NACE 60) and wholesale and retail trade and restaurants (NACE 50-52, 55) accounted for a large proportion of the CO2 tax in 2002. This is mainly because road transport is taxed through motor vehicle fuels, reflecting the significant environmental impact of road transport, both locally and globally. Manufacturing (NACE 15-37), electricity and gas works and heating plants (NACE 40-41), and mining and quarrying (NACE 10-14) were the industries with most tax subsidies in the area of carbon dioxide taxes.

Table 1. Environmental taxes in Sweden, 1993-2004 (million Euros)

Current prices, million EUR (1 EUR = 9,4 SEK)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003*	2004*
Energy tax	**4 152**	**4 513**	**4 633**	**5 326**	**5 299**	**5 599**	**5 591**	**5 618**	**5 956**	**6 335**	**6 658**	**6 808**
Energy tax (total)	2 791	3 036	3 157	3 502	3 726	3 958	3 975	4 076	3 875	3 956	3 881	3 744
of which: fuel tax	2 183	2 424	2 501	2 713	2 789	2 854	2 837	2 874	2 538	2 470	2 216	1 914
electricity tax	607	613	656	788	937	1 103	1 139	1 202	1 337	1 487	1 665	1 830
Other product taxes on electricity	239	253	259	435	242	258	265	249	276	259	243	252
of which: hyrdroelectic power tax	109	85	99	162	-	-	-	-	-	-	-	-
nuclear power tax [1]	11	15	14	119	157	165	164	182	198	190	195	198
fees/tax for reduction and storage	119	153	146	155	86	93	101	68	78	69	49	54
Carbon dioxide tax	1 123	1 224	1 217	1 388	1 331	1 384	1 351	1 292	1 806	2 120	2 533	2 811
Tax on certain substances	**62**	**60**	**72**	**81**	**60**	**58**	**53**	**169**	**152**	**156**	**151**	**128**
Sulphur tax	20	20	17	23	15	16	13	9	11	17	13	10
Tax on domestic air transport	21	20	20	12	-	-	-	-	-	-	-	-
Tax on insecticides	1	2	3	4	6	6	4	6	6	5	7	6
Tax on commercial fertilizers	20	17	32	41	40	36	36	38	39	38	36	32
Tax on waste	-	-	-	-	-	-	-	115	96	96	95	80
Tax on transportation	**864**	**623**	**617**	**715**	**686**	**674**	**708**	**747**	**744**	**791**	**818**	**834**
Vehicle tax	436	432	431	582	664	649	680	727	746	790	818	834
Sales tax on motor vehicles	137	189	186	133	22	25	28	21	-2	2	0	0
Kilometre tax	291	1	-	-	-	-	-	-	-	-	-	-
Tax on natural resources	**-**	**-**	**-**	**7**	**14**	**15**	**15**	**13**	**13**	**12**	**21**	**21**
Natural gravel tax	-	-	-	7	14	15	15	13	13	12	21	21
Total environmental taxes	**5 077**	**5 195**	**5 322**	**6 129**	**6 060**	**6 346**	**6 367**	**6 548**	**6 865**	**7 295**	**7 647**	**7 791**
Per cent of GDP in Sweden [2]	3,1%	3,0%	2,8%	3,2%	3,0%	3,0%	2,9%	2,8%	2,8%	2,9%	2,9%	2,9%
Env. taxes in EU as per cent of total GDP in EU	2,8%	2,9%	2,8%	2,9%	2,9%	2,8%	2,9%	2,8%	2,7%	-	-	-

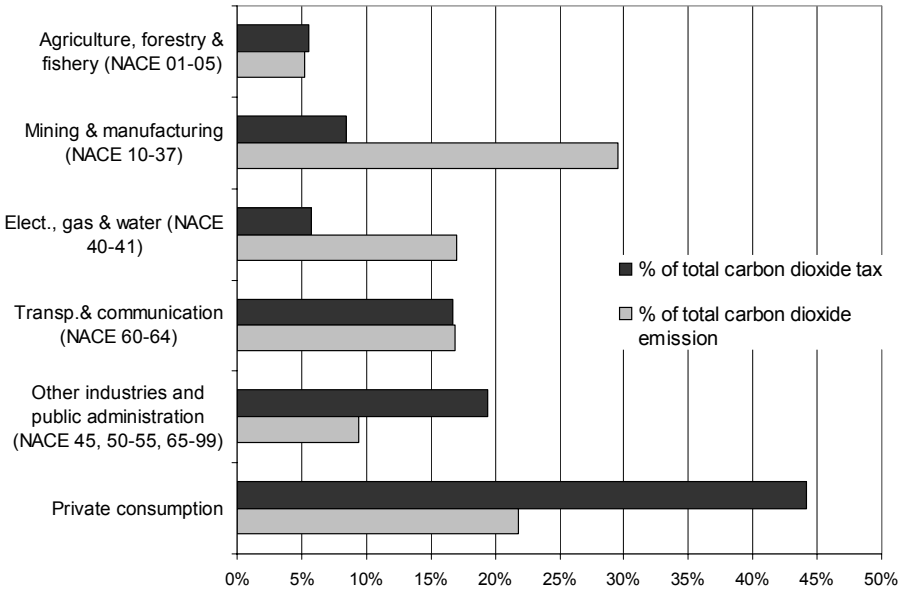
[1] The tax on electric power ceased July 1, 2000 and was replaced with a tax on nuclear reactor thermal power.

[2] GDP at market price, current prices.

* 2003 and 2004 = Preliminary data

Source: Statistics Sweden

Figure 3. **Taxes and emissions of CO2 by industry, 2002 (% of total for Sweden)**



Environmentally motivated subsidies in the environmental accounts

The Swedish environmental accounts work start out from the total subsidies as defined in the national accounts (SNA-subsidies). After identifying relevant subsidies from these, additional environmentally motivated subsidies are included to broaden the definition of a subsidy. Due to difficulties in pointing out "harmful" subsidies, the work has so far focused on finding subsidies given with an environmental purpose, so called environmentally motivated subsidies.

Figure 4 presents the total environmentally motivated subsidies in Sweden, separated into the two different subsidies and data sources used in the Swedish SEEA. Investment subsidies make up about half the total environmentally motivated subsidies in Sweden.

Figure 4. **Environmentally motivated SNA-subsidies and investment subsidies in Sweden 1993-2000 (million Euros)**

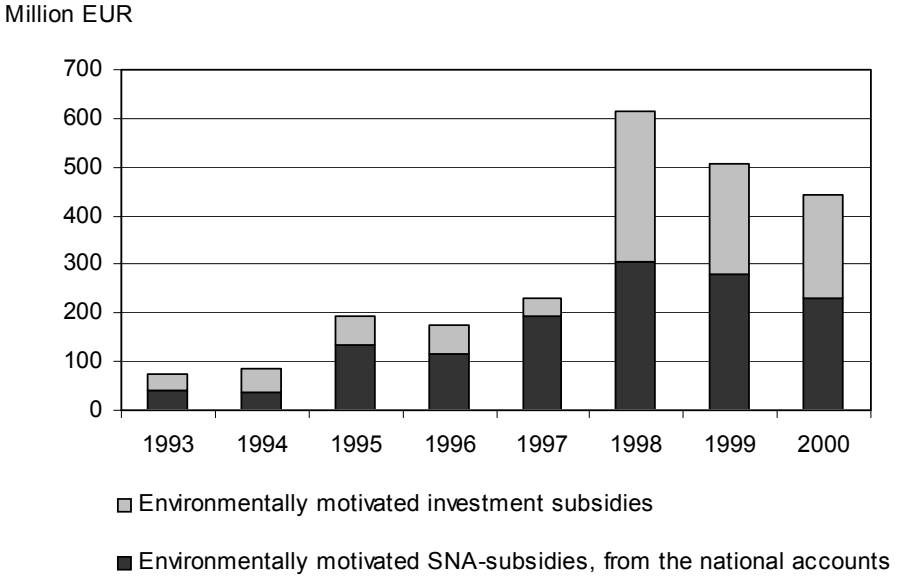


Table 2 presents the total environmentally motivated subsidies in Sweden in more detail. The Swedish environmentally motivated subsidies have increased as a percentage of GDP between 1993 and 2002. The total environmentally motivated subsidies came to 0.18 per cent of GDP in 2002. The resource-related subsidies were responsible for approximately 80 per cent and the energy-related subsidies about 20 per cent of the total environmentally motivated subsidies in Sweden in 2002. Resource-related subsidies are dominated by subsidies to the agricultural sector. Other resource-related subsidies in Sweden affect the fishing sector and environmental research.

Figure 5 only illustrates about half of the total environmentally motivated subsidies, the so called SNA-subsidies, since the investment subsidies have not yet been distributed onto the receiving industries. The largest SNA-subsidies are given to *Agriculture, fishery and forestry* (NACE 01-05). This is due to the large resource subsidies, which are given in the agricultural environmental program for biodiversity purposes among other purposes. The second largest sector receiving payments is *other* (NACE 70-99) and this includes the subsidies given for environmental research. The third largest industry given environmentally motivated subsidies is electricity, gas and water (NACE 40-41), where promotion of renewable energy and energy efficiency projects has received subsidies.

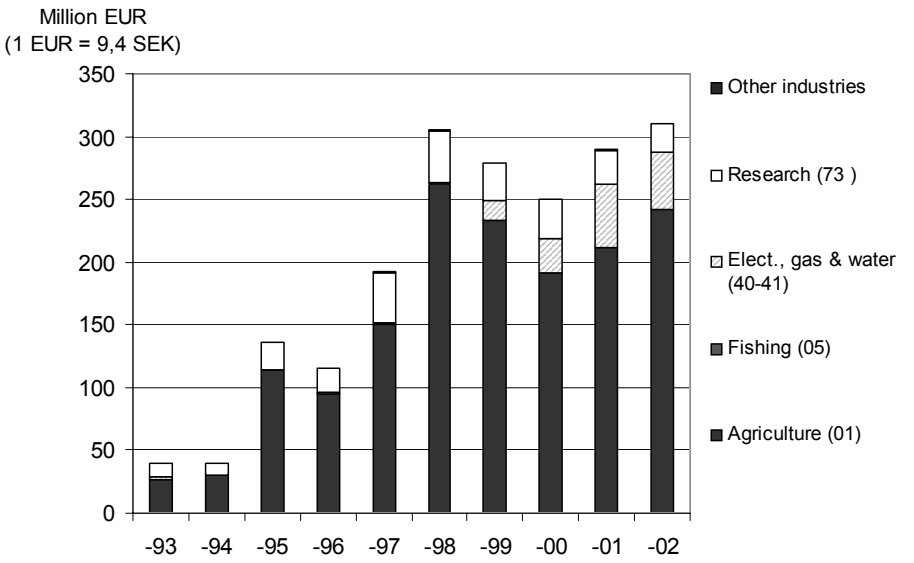
Table 2. Environmentally motivated subsidies in Sweden, 1993-2002 (million Euro)

Current prices, million EUR (1 EUR = 9,4 SEK)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Resource-related direct subsidies:	**44**	**57**	**153**	**134**	**204**	**326**	**295**	**252**	**292**	**371**
Landscape conservation measures	2	3	0	0	0	0	0	0	0	0
Environmental supports in agriculture [2]	24	27	114	95	150	260	233	190	210	239
Subsidy to preserve the fish	0	0	0	0	0	0	0	0	0	0
Research about environment and ecocycles	0	0	1	1	0	1	0	0	2	1
The Council for Forestry and Agricultural Research/later FORMAS	0	1	3	4	22	22	24	24	15	10
Measures for improving the environment in the agricultural sector	1	0	0	0	1	2	1	1	2	2
Subsidy for environmental work	0	0	0	1	1	2	0	0	0	0
Support for local investment programs [3]	-	-	-	-	-	0	0	0	8	32
Investment subsidy for an ecological restructuring	-	-	-	-	1	3	5	3	2	1
LIFE environmental fund	-	-	4	7	5	10	4	0	9	8
Support for liming of lakes and watersheds	16	17	20	18	15	20	18	19	21	20
Support to protect the nature	-	8	8	5	6	6	7	8	11	13
Support to sanitation of polluted areas	2	2	2	2	2	1	3	7	13	44
	0	0	0	0	0	0	0	0	0	0
Energy-related direct subsidies:	**32**	**38**	**50**	**47**	**35**	**49**	**68**	**58**	**90**	**91**
Energy technology support	0	6	5	5	5	9	28	8	23	10
Measures for providing heat and power in southern Sweden	0	0	0	0	0	0	2	2	4	14
Energy efficiency measures	2	0	2	3	1	2	2	1	1	1
Energy efficiency measures in the Baltic States and eastern Europe	0	0	0	0	0	0	0	0	-	-
Small-scale electricity support	-	-	-	-	-	-	-	18	25	24
Energy research	10	9	16	15	17	18	5	7	11	14
Investment subsidy for renewable energy	19	24	25	25	10	9	18	19	24	17
Investment subsidy to reduce the use of energy in houses and for conversion	-	-	-	-	-	11	13	3	2	10
Subsidy for solar heat establishments in houses, apartments and premises	-	-	-	-	-	-	-	0	1	1
Investment for an extension of district heating	-	0	3	0	1	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
Transport-related direct subsidies	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	**0**
Research subsidy on electrical and hybrid vehicles	0	0	1	0	0	0	1	0	2	-
Total environmentally motivated subsidies	**76**	**96**	**205**	**182**	**239**	**375**	**365**	**310**	**384**	**462**
Per cent of GDP in Sweden [4]	0,05%	0,05%	0,11%	0,09%	0,12%	0,18%	0,16%	0,13%	0,16%	0,18%

[1] An environmentally motivated subsidy is determined by the motivation of the subsidy/the budget line that gave rise to the subsidy. The name of the budget line or of the direct subsidy is used in the table.
[2] The budget line principally finances environmental supports in agriculture, such as for example conservation of biodiversity in the farmed landscape and environmentally friendly agriculture. The name of the support/programme has changed over the years.
[3] The investment programme exists since 1998. A total of SEK 6,2 Billion has been granted and the subsidies are paid out after the projects are reported. The subsidies above are actual paid subsidies
[4] GDP at market price, current prices.

Source: Statistics Sweden (SCB), Swedish Board of Agriculture, National Board of Housing, Building and planning
Swedish Energy Agency, Swedish EPA and Swedish National Financial Management Authority

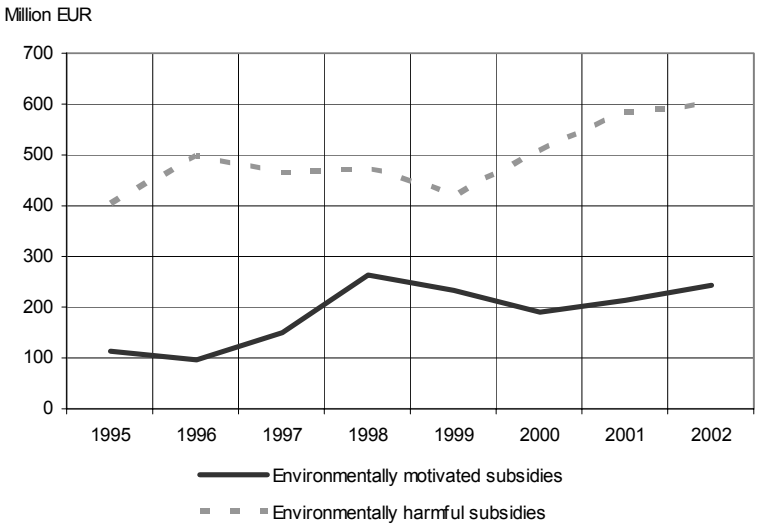
Figure 5. **Environmental subsidies in Sweden by industry, 1993-2002 (million Euros)**



There are several industries not receiving any payments from environmentally motivated subsidies. These are mining and quarrying (NACE 10-14), manufacturing (NACE 15-37), construction (NACE 45), wholesale and retail trade (NACE 50-55), transport and communication (NACE 60-64) and financial intermediation (NACE 65-67). Future distribution of also the environmentally motivated *investment* subsidies will show if the distribution to industries is different depending on type of subsidy or if they are transferred to the same parts of the economy.

It is also possible to do industry specific analyses with the subsidy data. In **Figure 6** only the agricultural and fishing sector is presented. Also here only SNA-subsidies are included. The so called "harmful" subsidies are taken from a previous study at Statistics Sweden (2000), since these statistics are not regularly produced in Sweden. The three subsidies previously defined as potentially harmful were considerable larger than the environmentally motivated subsidies identified. They included acreage and livestock support and support to fisheries and reindeer husbandry.

Figure 6. **Comparison of SNA-subsidies in the agricultural and fishing industry (NACE 01, 05), 1995-2002 (million Euro)**



Conclusions

The data presented in this paper shows that environmental taxes and environmental subsidies tend to target different areas. While the majority of the environmental taxes are classified as energy- and transport-related the environmentally motivated subsidies are mainly resource-related, an area that may be more difficult to impose taxes on.

There are many possibilities with the System of Economic and Environmental Accounting (SEEA) regarding identifying, measuring and estimating the environmental effects of economic policy tools. It can give a general picture of economic policy tools and might also be a possible tool to follow progress in reform of subsidies. It is important that the data is internationally comparable. In order to have comparable data there is an increasing need for harmonized definitions and frameworks.

Besides working on defining harmful subsidies, there is need for work on how to define a subsidy as well as describing possible data sources and frameworks, especially if the purpose is to compare the results between countries. OECD is probably one of the best organizations to perform such work and have already come a long way in this direction. Maybe OECD and Eurostat can work together in this matter as they did regarding the definition of environmental taxes? There is furthermore a lot of potential in the EEA/OECD database of economic instruments. However, this work needs harmonized definitions and manuals in order to have high quality data and be able to compare the results.

A current project at Statistics Sweden is to identify and separate environmentally motivated investment subsidies from total investment subsidies in the national accounts in order to make data collection simpler. These data will be categorized according to receiving industries, households and the public sector in order to present the statistics on industries together with environmental data.

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Part II

Case Studies of Subsidy Reform Experiences in Agriculture and Fisheries

SUBSIDY REFORM AND SUSTAINABLE DEVELOPMENT: ECONOMIC, ENVIRONMENTAL AND SOCIAL ASPECTS – ISBN-92-64-02564-2 © OECD 2006

Chapter 3. Subsidy Reform in the New Zealand Agricultural Sector

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Introduction

The publication in 1987 of "Our Common Future" provides the most commonly used definition of sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs." This formula has enormous human appeal and it also forms the core of New Zealand's current approach to sustainability such that it provides a useful means of ensuring that the inter-connectedness of many economic, social and environmental issues is reflected.

Economics and sustainable development

Sustainable development as an economic concept dates back to early attempts by environmental economists to use cost-benefit analyses to understand environmental problems and design policy instruments to deal with these. The relative failure of "pure" cost-benefit analyses led to a fertile debate on how to make policy sense of the concept and the development of a range of different approaches. Many of these have helped inform and in some cases define national approaches to sustainable development.

Economic theory suggests that increasing preferences for the environment should lead automatically to the right levels of preservation. In the real world this rarely works. Market-based approaches alone are often not enough. Devising economic instruments to manage a resource like biodiversity, for instance, without understanding its function within the ecosystem of which it is a part may be a recipe for disaster. More generally, the conditions under which environmental services would reach equilibrium are sufficiently restrictive that it is likely to be the exception rather than the rule. Most environmental amenities are non-marketed and their characteristics are such that they are unlikely to be properly priced as inputs without some form of intervention in the market. In most circumstances therefore, a reliance on economics alone to frame analysis may result either in a "tragedy of the commons" through depletion (e.g., the deterioration of global fish stocks, or the loss of biodiversity), or despoliation/under-provision (e.g. of clean air or water).

Importantly too, particularly in the case of OECD countries, the environmental Kuznets curve suggests that individuals in developed economies will have a strong preference for environmental services. Such preferences have already manifested themselves in New Zealand through inter alia the setting aside by Governments of considerable amounts of protected areas in an effort to maintain and sustainably use regions of unique diversity. There is, however, also increasing evidence that the

environmental Kuznets curve does not always apply, including for instance in the case of carbon dioxide emissions. In the New Zealand case, the rise in overall greenhouse gas emissions, despite rising per capita income levels provides a specific instance of the difficulties of using the Kuznets curve on its own as an explanatory variable. Moreover, there is evidence that industrialised countries have been able to reduce their energy requirements and flatten their otherwise rising Kuznets curves by "exporting" emissions through importing manufactured goods from developing countries.

As a discipline economics has tended to regard sustainable development problems to be primarily the product of market failure. Resolution of such failures requires a conceptualization of trade-offs between the three pillars of sustainable development and the use of a range of instruments, including economic and legal ones to ensure the efficient implementation of such trade-offs. Of particular interest for this analysis is the impact of economic reform on sustainable development, including in particular the elimination of subsidies. The question is *what level of protection/intervention? What should be the trade-off between environmental protection and social and economic development?* Instruments which may be used to respond to such questions may include, among other things, the application of polluter pays policies; the establishment of property rights; agreed standards of liability; reforming support mechanisms that affect the environment or other regulatory measures.

Against this background, the real policy question becomes about the trade-off between the amount of protection or assistance that should be given and the economic costs of doing so. This is perhaps the most useful way to characterise the provision of subsidies to the agricultural sector and one which, as this paper illustrates, finally persuaded policy makers that the elimination of subsidies was the best possible economic and, incidentally, environmental outcome for New Zealand. It is against this background that the removal of subsidies to the agriculture sector in New Zealand will be briefly summarised. Drawing on the paradigm of sustainable development explored above, it then describes some of the economic and social impacts of this reform, with a specific emphasis on the environmental effects.

The paper concludes that linking the negative environmental effects of subsidies with their distortive economic effects may help provide further momentum for meaningful reform, not least through successive rounds of trade negotiations. Finally, a brief overview is provided of the key political economy lessons which may be drawn from the reform process. In particular, it is noted that the environmentally harmful effects of subsidies, while not a new issue, may now be coming into their own as a potent weapon in favour of meaningful reform.

The New Zealand reforms in context

New Zealand's agricultural reforms of the mid 1980s were particularly significant for an economy which is dependent for its livelihood on the export of primary products and trades heavily on its "clean green" image. The removal of agricultural subsidies had a profound, generally positive, impact on New Zealand's sustainable development prospects. That said many of its favourable environmental effects were unintended. And the reforms themselves were not driven by a concern for the environment. Rather, it was a concern for the economic unsustainability of the subsidy programmes themselves which provided the catalyst for the reform process.

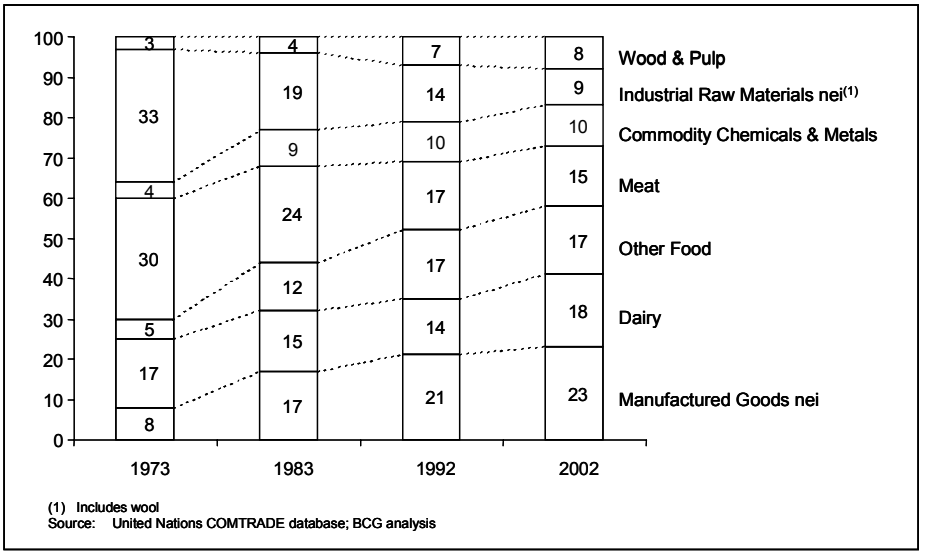
A trading nation with an agriculture sector living beyond its means

New Zealand's historical economic development was stimulated by the opportunity to sell primary products like wool, dairy products and meat to the United Kingdom and other industrialised countries. The growth of manufacturing and the very sharp trend upwards in population in those countries increased the demand for food and industrial raw materials. This demand was met in part by New Zealand which, in aggregate terms at least, focused its development (and macroeconomic policy) on its burgeoning commodity export sector. At the same time, and like most liberal developed economies over the past eighty years, New Zealand has pursued broadly orthodox Keynesian economic policies with limited nationalisation, social welfare and employment protection policies.

Protection of the domestic market became standard practice, however, throughout much of the last century. Trade flows were narrow and focused on the United Kingdom, particularly over the first sixty years of the twentieth century. When the latter sought closer integration in the then European Economic Community, New Zealand's trade flows diversified, even if their composition did not. External crises, including the oil shocks and the changing nature of international economic trends drove the demand for domestic trade liberalisation which culminated in the mid 1980s with far-reaching reforms which restructured both the domestic economy and fundamentally changed the country's trade policies. There was a marked shift away, for instance, from mercantilism to trade liberalisation in general and almost overnight the removal of a range of support measures, including for the agriculture sector.

Arguably the single most important trade policy point to draw from the period since the United Kingdom signalled its intention to join the European Union is that New Zealand has *not* diversified out of the primary products sector. That is not to say that in aggregate terms there has not been diversification. There has. This diversification has, however, been narrowly focussed on primary products and food processing. **Figure 1** below underlines the point. Indeed, New Zealand is unique in the OECD in maintaining over time such a level of concentration. Turkey, Mexico, Poland and Slovakia for instance all have seen their export sectors diversify more rapidly in the past ten years than New Zealand's.

Figure 1. **Composition of New Zealand exports of merchandise goods over time**



This limited level of diversification over time underlines the obvious point that New Zealand's comparative advantage remains primarily with agricultural products – including processed foods. These form the enduring core of New Zealand's ongoing trading relationship with the world. It is in this context that the reforms of the agriculture sector in the mid 1980s, specifically the elimination or reduction of over 95% of subsidies had such a significant impact on the country's sustainable development.

New Zealand's reforms of the 1980s reflected a concern about the country's long-term sustainability

By 1983-4, New Zealand's general macroeconomic situation had deteriorated markedly. More specifically, some of the country's key economic indicators were signalling a serious problem, including:

a) An unemployment rate which had reached 7 percent by 1983 compared with less than 1% a decade before;

b) Inflation tracking rapidly upwards with the consumer price index (CPI) reaching the 20% mark before the imposition of price controls in 1982;

c) Real GDP per capita growth averaging barely 1 percent per annum between 1976 and 1984;

d) A ballooning fiscal deficit which by 1983 had increased to nine percent of GDP;

e) A chronic current external deficit which was placing serious pressure on the effective management of the government's overseas debt management with attendant negative implications for the exchange rate;

f) Government net debt had risen from less than 10 percent in 1976 to 41 percent of GDP by the mid 1980s resulting in a looming public debt crisis; and

g) Accelerating monetary growth as a consequence of the Government's micro-management of interest rates.

In the agriculture sector the economic situation had become similarly difficult. The two decades to 1984 had seen a gradual acceleration in production grants and subsidies to the agriculture sector. In the 1960s agricultural support amounted to just 3% of farm income, by 1983 it was nearly 40% in the sheep sector alone. This was equivalent to four percent of New Zealand's GDP. Initially relatively narrowly focused, the programmes rapidly expanded to include a range of production-related measures such as concessionary livestock valuation schemes; fertiliser subsidies; loans to farmers at below-market rates; generous tax rebates; and lucrative incentives for land development. At its height there were some 30 different forms of assistance to farmers.

This was further boosted by a deficiency payment scheme (Supplementary Minimum Prices). By 1983, New Zealand's Producer Subsidy Equivalent (PSE) had peaked at 34 per cent and the Effective Rate of Assistance surged to 123 per cent. These export subsidy support levels were made considerably worse because they were combined with even higher rates of import protection and a general regulatory structure which in many cases was more akin to those extant in OECD countries in the mid 1950s and before.

While still moderate by world standards, the support levels were high for New Zealand. All of this had ominous implications for the sustainability of the agriculture sector and indeed the wider economy. Successive OECD Economic Surveys in the early to mid 1980s reported that the support being provided to the agriculture sector was no longer financially sustainable. In particular, the 1984-5 OECD Survey indicated serious problems with the SMP programme and a range of other production-related subsidies, noting that these were an effective brake on economic development.

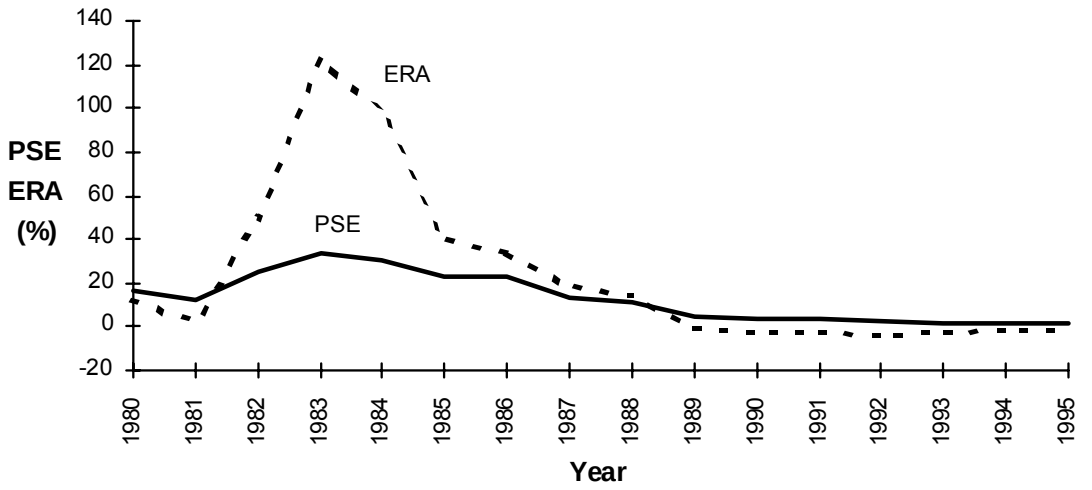
In fact, by 1984-5, the economic situation in the agriculture sector was precisely the way economic theory would describe the distortionary effects of subsidisation:

- Supply and demand bore no relationship to one another. Production had soared, but there were no buyers. In 1970, the national flock comprised 55 million sheep, by the mid-80s there were 70 million, with the Government funding the slaughter of sheep that could not be on-sold. In 1983, for instance, the government ordered six million tonnes of sheep meat to be turned into fertiliser, as there was no market for it and no room left in cold storage plants.
- Prices were inflated and bore no relationship to market values. Land prices were a case in point. These were inflated as subsidies were capitalised into land values. The increases in values exceeded 200 percent between the late 1970s and mid-80s.
- Decision-making was distorted: Subsidies encouraged farmers to bring large areas of marginal land into production and by 1984, in excess of two million hectares of marginal land was being farmed solely because subsidies made this profitable. All of this helped ensure that farmers derived the maximum economic benefit from this financial assistance – but at significant cost to the environment and in terms of long-term economic development.
- Taken together, it was not surprising that by 1984-5, increased output from the agricultural sector was generally worth less than the actual costs of production and processing. And the agriculture sector was not the only part of the economy that was experiencing a downturn. Government spending sharply increased. High domestic inflation and a collapse in the terms of trade were rapidly reducing New Zealand's international competitiveness. Accumulating budget deficits financed in part by off-shore borrowing and in part by literally printing money drove

official overseas debt and inflation into double digits. As time wore on New Zealand's balance of payments deficit became chronic and its credit rating collapsed making borrowing increasingly expensive. It was this worsening economic situation which provoked a far-reaching and substantive economic reform programme.

The agriculture sector and specifically subsidies to farmers were not immune, indeed in many respects the sector was the primary target for reform. The Government moved quickly by abolishing minimum price schemes for wool, beef, sheep meat, and dairy products. In addition, tax concessions for farmers were withdrawn. Free government services for farmers were also eliminated. Producer Boards had their access to concessionary Reserve Bank funding withdrawn. Land development loans; fertiliser and irrigation subsidies; and subsidised credit were also reduced and then phased out from 1987, as were assistance for flood control, soil conservation, and drainage schemes. The scale of the change is underlined in **Figure 2** below. This shows the continuing decline from an average PSE of 24 per cent in 1979-86 to 3 per cent in 2005. The Effective Rate of Assistance (ERA) shows even more clearly the decline in real assistance.

Figure 2. **Percentage assistance to New Zealand Pastoral Agriculture before and after removal of subsidies**



Assistance figures are calculated with stabilisation payments spread over the years in which losses actually occurred, and not when settled

The impact of reform was far-reaching and rapid, particularly on the economic pillar

The concept of sustainability encompasses three inter-related "pillars". As has been outlined above, it was the economic pillar which drove the reform process in New Zealand and over the medium to long term there is little doubt that this core element of sustainable development was substantively strengthened as a consequence.

In general terms, the economic indicators for the sector have improved across the board since subsidies were eliminated. It is important, however, not to overdraw the

causal relationship between the removal of subsidies and the improvement in economic indicators. The removal of subsidies alone was not the sole contributing factor for the upturn in economic fortunes of the sector. Their elimination needs to be seen against the background of wider reforms taken across the economy (including the floating of the dollar, phased tariff liberalisation which lowered input prices and so on). Nevertheless, it is clear that the removal of subsidies was an important contributing factor (if not the only one) to the changed and improved circumstances of the sector following the reforms of the mid 1980s.

Perhaps the most dramatic change triggered by the reforms was to the sheep sector. The national flock was sharply reduced from 70 million in 1983/4 to 40 million today. There are now 31% fewer sheep and beef farms. There has been a shift in focus from quantity to quality; lambing percentages, for instance, have actually increased by 25% compared with the 1984-5 levels. Average carcass weights have also increased by a quarter. General agricultural productivity growth is three times greater than in the economy as a whole and some of the most spectacular gains were in sheep breeding. In 2002, for instance, the export revenues from a sharply reduced flock exceed those generated by the 70 million strong flocks extant in the early 1980s.

As a direct result of the reduction in stock numbers, many processing companies were forced to close in the mid 1980s. Processing plants in New Zealand are now smaller on average, closer to the sheep farming areas and much more modern and sophisticated. They have also managed to smooth processing across the year to a considerable extent. Particularly important perhaps is the point that processing companies have focused on adding value. In 1982, carcasses accounted for 82% of New Zealand's global lamb exports. Now 90 percent of sheep meat exports are cut and pre-packed before they leave New Zealand. New Zealand has also diversified its markets and many New Zealand companies have processing facilities in overseas markets to better supply supermarket chains with specific cuts on request and on a "just-in-time" basis. In 1980, the UK and the wider European Union absorbed some 80 percent of our agricultural exports. The EU now takes less than half that figure.

While the decline of the sheep sector was one striking economic outcome of the reform, the change in dairying was no less profound. The number of dairy herds fell 17% from nearly 16,000 to around 13,000. Significantly, however, the national herd actually increased from 2.3 million to 5.3 million. Moreover, the average herd size has increased from 150 to 270 and there has been a 75 percent increase in the volume of dairy production. This has led to a fundamental shift in the pattern of New Zealand's trade with dairy exports worth nearly €4 billion in 2004. In 1984, New Zealand did not have a deer industry and there were no venison exports. Two decades later, the national deer population is around 2 million and export earnings exceed $NZ200 million.

Horticulture has been a primary beneficiary of the removal of subsidies. Production of apples, kiwifruit and wine has risen sharply. To take one example, in 1984/5 New Zealand exported 48,000 tonnes of kiwifruit. In 2004, it exported 240 thousand tonnes. Wine has also been a growth industry; exports were worth NZ$250 million last year and are expected to treble by 2007.

Underlining the distortionary nature of Government subsidisation and its capitalisation into farmland values, the nominal value of farmland prices fell by some 50% in real terms by 1988 as a direct consequence of the removal of subsidies to the sector. Less than a decade later in 1995, however, farmland values had recovered to

around 86 per cent of their 1982 value, in real terms and currently stand at more than 100 percent of the 1982 figure.

One of the spill-overs from the subsidy reform programme had been the expectation that farm sizes would change. A decade after the reforms it was clear that the elimination of subsidies had only a limited effect on farm size, a point which remains true today. In effect, there was some consolidation and an increase in the size of some holdings 9eg dairy herds expanded), though this has been primarily a consequence of a drive towards greater efficiencies of scale. That said, the elimination of land development subsidies has meant the withdrawal of a small area of marginal land (i.e. land not suited for pastoral agriculture) from production. Much of this land has also been re-forested. Moreover, farm distribution has become increasingly bi-focated – more and larger farms (dairy, sheep and arable) and smaller farms (viticulture, horticulture, venison). Not surprisingly therefore, overall numbers of employment on-farm have not fallen, not least because the horticultural sector is more labour intensive.

In summary, while on one level, the sheep sector was particularly hard hit by the reforms and has shrunk over the past two decades it has become more efficient and profitable and produces more sheep meat. Moreover, other sectors have benefited significantly from the elimination of subsidies. The dairy and horticultural sectors have been major beneficiaries of agricultural resource mobilisation. Perhaps the most important change in aggregate has been the enhanced flexibility of a sector that had been renowned in New Zealand for its inability to respond to change. Specifically, the removal of subsidies helped increase the sector's incentives to respond more effectively and efficiently to price signals by switching to new or different types of production. Significantly, there were no incentives or subsidies to assist these land use changes. They were business decisions that no government would ever had had sufficient information to make. Risks have been diversified – and responsibility for commercial viability squarely accepted by farmers themselves.

Subsidy reform: the social pillar weakened?

As with any such rapid reform process, there were social costs for the New Zealand agricultural sector as well. What is perhaps surprising is that the impact on what is known as the "social pillar" of sustainability was not as great as had been widely predicted at the time.

While rural incomes experienced a general decline during the 1980s, it is important not to exaggerate the rate of decline and also to underline the point that this fall did not result solely from the removal of government support. A combination of high inflation and interest rates, an appreciating New Zealand dollar and lower than expected prices for dairy and meat products in world markets all played their roles. Moreover, throughout the 1970s and the early 1980s, negative real interest rates had stimulated over-borrowing on a significant scale and this meant that many farms suffered losses on the eventual return in the mid 1980s and onwards to positive real interest rates.

Moreover, these low world prices were a direct result of the subsidisation programmes extant in the United States and the European Community, which continue to have effects beyond their own economies. In addition, the Government's failure to implement the deregulation process across all sectors of the economy led to unnecessary hardship. The planned tariff liberalisation process, for instance, proceeded a great deal more slowly than planned and certainly at a much slower pace than the subsidy

elimination programme. This meant that on a range of inputs for farming, the rural sector was paying a premium as a consequence of high tariff rates. Nevertheless, by 1988-9, farm prices began to rise. Improving world markets for pastoral products combined with falling input prices (a consequence of a belated and in some areas half hearted tariff liberalisation process) and lower processing costs cumulatively improved farmer incomes.

The decline in discretionary expenditure by farmers including on all non-essential repairs and maintenance; new land development; fertiliser applications; and capital expenditure on new plant and equipment did have wider social effects. Many small rural firms went out of business and a large number of farm labourers became unemployed as farmers did more of their own work. Operating expenses, as a percentage of gross farm income, fell from a peak of 80 per cent in 1984 to below 60% per cent.

In the end there were only 800 forced sales out of 80,000 farms. Around 1 percent of farmers left the industry. This was considerably less than the projected 16 percent that had been widely touted. Nevertheless, the social costs while relatively isolated were high. There were some suicides and some farmers were forced to draw on social welfare assistance for a time. Many small rural towns experienced reductions in population in the mid 1980s as farmers stopped spending and people left in search of jobs elsewhere. Public services like schools and small hospitals contracted in the wake of this rural downsizing. Notwithstanding this, the rural collapse predicted by some never eventuated. In fact, New Zealand's rural population actually rose slightly between the 1981 census and the 2001 census despite the removal of subsidies.

Strengthening the social pillar

Transitional assistance to groups affected by reform is increasingly seen as a standard economic tool designed to smooth the reform process. In New Zealand's case, what is striking is that such measures were sparingly used. This was in part the consequence of the speed and pace of the reforms which meant that flanking measures were not conceived and implemented in time. The primary reason, however, for the relatively limited assistance provided the sector, however, remains the Government's straitened financial circumstances. Nevertheless, the Government provided some transition assistance to farmers through debt rescheduling in 1986-7 and provided a modest exit package for farmers who still remained in debt.

The Government also provided some assistance with some farm debt restructuring. The government-owned Rural Bank wrote off some farm debt and the Government encouraged private lenders to do the same. Many farmers received assistance to develop business plans and help them through credit mediation, involving experts in finance, law, and farm management. In the end, about 20 per cent of the total rural debt was written off and about 6 per cent of farms were sold (mostly to other farmers), considerably fewer than had been predicted. Moreover, one important benefit of the reform has been to place the rural sector on a more sustainable footing in terms of income. This has been because the elimination of subsidies directed the sector into activities which could be economically viable. This included a move into rural and eco-tourism and, as discussed already, a greater preparedness to consider horticulture, viticulture and deer farming.

The removal of subsidies was initially unpopular and culminated in the largest rural sector protest march in New Zealand's history on Parliament in early 1986. Notwithstanding this level of anger, Federated Farmers, the main farmers' organisation

strongly supported the wider reform process. It considered that reform across the board would ease the pressure on farmers by, inter alia, lowering the costs of production. And in 1987, the reforming Labour Government was returned to power assisted in no small part by votes in the rural sector. The Government actually increased its majority, including winning a rural farming electorate (Manawatu) that had once been an opposition stronghold.

The environment - the accidental beneficiary of the reforms

The environmentally harmful aspects of subsidies are increasingly well known. In 1984, however, when the Fourth Labour Government launched its reform programme, this was not the case. This is perhaps understandable given that the Brundtland report was a work in progress and the Rio Conference was still eight years away. Not surprisingly therefore, preserving the environment was not a factor driving the reform process – though it was a significant if unintended beneficiary.

The impact of subsidies on the environment is generally understood to be primarily indirect (though the direct effects should not be underestimated), but important. These second-order effects are what Geritse once described as "externalities that we did not bargain for" and it is these that have come under sustained (if relatively recent) attack by economists and environmentalists, not least because of an increased understanding that the removal of subsidies can have positive environmental effects. The New Zealand reforms provide support for this view.

In the context of the economic changes wrought by subsidy reform, it is important when detailing the changed environmental conditions *not* to over-state the causality of the relationship between the subsidies being removed and the improvement in environmental indicators. This is compounded in the case of New Zealand since reliable data and time-series-based evidence on many of the measures cited below is relatively incomplete in parts and unreliable in others. Nevertheless, bearing these caveats in mind, it is possible to make the case that while the causal relationship may be less direct, or perhaps less clear than might be desirable, the removal of support was an important contributory factor in the improvement of some of the environmental indicators considered below. At the very least, the removal of subsidies cannot be causally linked to any worsening of any of the indicators. Against that background and with that caveat on causality, the following provides a "before and after snapshot" of the environmental effects of the removal of subsidies in New Zealand.

Fertiliser use

The environmentally harmful effects of fertilisers relate primarily to the possible impact on water quality. The removal of subsidies has caused reductions in the leaching of phosphates from hill country pasture catchments, where phosphate is the dominant nutrient applied. Fertiliser purchases by farmers have been positively related to farm incomes and output prices. Subsidies were a primary input into incomes over the period and this helps explain a rise in fertiliser usage by between 10 per cent and 25 per cent during the 1970s and early 1980s.

The removal of both subsidies in general and specific fertiliser-related support led to a concomitant decline in fertiliser use. Unfortunately, as a consequence of the Government's decision to give advance notice of the elimination of fertiliser subsidies,

application of superphosphates rose sharply in 1984 and 1985 and declined just as dramatically thereafter. Total gross tonnage is currently below the high points of the two years between 1978-1980.

If New Zealand had not removed its agricultural subsidies in the mid 1980s, it is reasonable to assume that the pattern extant during the period of subsidisation would have continued, i.e. that input use would have been higher during the 1985-1993 period, and certainly higher than it is today. In terms of soil quality, it is clear that this has come under increased pressure, particularly as a result of over grazing. It is difficult, however, to compare this with the pre-1984 situation since relevant data is patchy or non-existent. One more recent analysis has indicated, however, that some 80% of agricultural land falls within acceptable target ranges desirable to maintain soil quality for environment and production-related purposes.

Pesticide use

Pesticide use in New Zealand was never subsidised directly in the way fertilisers were. Like fertilisers, however, government support as an input to farm incomes has been correlated with the increased use of pesticides. With the decline in rural incomes as a consequence of the elimination of subsidies and a shift in production, sales of pesticides declined after 1984, though less spectacularly than fertiliser use. T is worth noting, however, that the dominance of pastoral agriculture has meant that while horticulture is a major user of pesticides, its proportion (while greater than before the reforms) still remains low given the small share of agricultural land that it uses.

Livestock (numbers and composition)

As noted earlier, the most dramatic change wrought by the reforms was the decline in the sheep sector and the increase in dairying. These changes have had differing environmental effects. The fall in the national sheep flock has yielded positive environmental benefits, including for instance reductions in erosion and a decline in the presence in rural waterways of sediment, nutrients and faecal matter. This has been a consequence of the reduced pressure from grazing numbers. The removal of subsidies had a further positive impact on the environment since production-related assistance, for sheep in particular, masked the impact of market signals. Their removal forced farmers to respond directly to market forces meaning that adjustment has proceeded more quickly than might otherwise have been expected. In contrast to the sheep flock, the numbers of dairy cattle and deer, however, have increased. The dairy sector in particular while operating at a lower level of intensity than its European equivalents continues to make use of nitrogenous fertiliser. In some cases this has led to high levels of run-off into surface or groundwater supplies. A range of industry and farmer-led voluntary initiatives have been implemented to address such problems.

Greenhouse gas emissions

Closely related to stock numbers is the issue of methane emissions. New Zealand's greenhouse gas emission intensity is higher than all but a few OECD countries. Moreover, perhaps uniquely among OECD countries, agriculture is at the centre of national climate change mitigation policy. This is largely the consequence of significant numbers of ruminant farm animals (sheep, beef and dairy cows). Taken together methane emissions and nitrous oxide (from agricultural land/soils) accounted for almost 50% of

total (gross) GHG emissions in 1990, though transport-related emissions are also substantial (41% of energy emissions). Total emissions rose 5% between 1990 and 2001. Methane emissions, however, increased by nearly 35%. This rise is not related to subsidies or indeed to the agriculture sector generally where overall GHG emissions have increased somewhat. On the positive side, New Zealand's ability to adapt to the consequences of climate change has been improved through a combination of rural/farmer and Government investment in technological innovation designed to help provide the requisite adaptation tools.

Water use

Irrigation for farming in New Zealand accounts for nearly 60 per cent of all withdrawals and continues to grow rapidly. Subsidies for irrigation were proportionately higher than for other types of agricultural development and were removed relatively late (1988). While it is difficult to assess the causality of the removal of a wide range of subsidies which existed for irrigation and the improvement in water use because of a lack of time series data, it is generally agreed that while the land area now under irrigation has increased (not least as a consequence of the move into horticulture) water abstractions for agriculture have arguably not risen at the same rate as when subsidies were available for irrigation development. Nevertheless, a fundamental problem remains for New Zealand and this is that projections for irrigation water are projected to rise by nearly 30% through to 2010. This has important spill-over consequences for aquatic eco-systems and competing users for water resources. Moreover, New Zealand's limited application of instruments to price the water resource has effectively meant that there is no process of the full internalisation of the externality related to the use of this resource. Thus, while subsidies for irrigation may have assisted in alleviating pressures, the projections are that the situation will continue to require careful monitoring.

Water quality

The quality of New Zealand water has been generally high by international standards, both before and after subsidy reform. While there was a small dip in quality during the zenith of subsidisation as a consequence of the application of increasing amounts of fertiliser and general production-related support, this was never a particularly significant problem. More recently, however, the expansion of dairy farming in the late 1980s has affected water quality through contamination by effluent. The level of campylobacter infections, for instance is now well above other OECD countries with some 31.6 cases per million people in New Zealand compared with 7.8 in Australia and 6.6 in Germany. That said, the removal of subsidies is clearly not the cause of the changes in water quality. The increase in infection rates is a consequence of the increased size of the dairy heard which, in itself, is a response to the increasingly favourable international market conditions for dairy products. Indeed, the retention of subsidies would have made matters worse, not least by distorting market signals as to the profitability of dairying with the likely consequence of an every enlarging sheep flock leading to greater pressure on rural waterways as a consequence of waste and faecal run-off.

Land use

Subsidies for land development and for increasing livestock numbers throughout the late 1970s and early 1980s encouraged farmers to clear indigenous bush, forest and other

woody vegetation to increase pasture area for stock. With the decline in subsidies and in prices for pastoral products, it has become less economic to bring new land into production. Amendments to the Forests Act have also assisted in this process, including a requirement that any native trees that are to be milled into timber must come from sustainably managed forests. As a consequence, the felling of regenerating and established native forest for agricultural development has declined substantially with positive implications for sustainable development.

Disaster relief

Subsidies for disaster relief can encourage environmental degradation if these remove the incentive for farmers to plan for such contingencies. Livestock farmers may, for instance, need to reduce stock numbers when drought becomes a real possibility, and may also need to keep grazing pressure down to a level that will better enable hill country pasture to sustain heavy rainfall. The removal of most disaster relief-related support in the late 1980s ensured that sheep and beef farmers in particular adopted stocking policies that are better adapted to climatic risks and are quicker to respond to early signs of drought. This reduces the likelihood that pasture will be overgrazed and made more vulnerable to erosion. Subsidies to disaster relief had effectively shielded New Zealand farmers from having to consider such issues. Central government support is still available, within tight criteria, when an adverse event is beyond the ability of the local community to deal with. In such cases, support is provided in a manner that does not reduce individual responsibility for managing risk. A case in point was the assistance provided to the sector following the extensive damage caused by the flooding which occurred in the central North Island in New Zealand in early 2004.

Industry-led initiatives

There are several industry-led initiatives designed to improve the sustainability of the agriculture sector in New Zealand. These include a range of voluntary codes of practice utilised by, inter alia, the pork industry, the logging industry, sustainable wind production and an agrichemical education trust initiated by leaders in the horticulture industry. Guidelines for responsible fertiliser use have been developed by the fertiliser industry, and grazing guidelines have been implemented. In many of these cases, farmers and rural industry are motivated not just by the desire to consider sustainability issues or the possibility of regulatory pressure if problems are not addressed, but also by market considerations. The wider agricultural sector is aware that consumers in New Zealand and in overseas markets are increasingly interested in how a product is produced, in addition to traditional quality concerns. They are therefore supporting efforts to establish systems to ensure that their production systems are sustainable and that this can be demonstrated to consumers. Thus, in a variety of ways, the environmental costs and benefits of sustainable agriculture are being internalised to the production process.

… but is New Zealand unique?

Perhaps, but there are some lessons that may have a wider application. It has become a truism to say that a feature of New Zealand's uniqueness is its geographic isolation and its small size. Certainly, relative to other OECD members these factors, particularly the one related to distance, make New Zealand something of a special case. The small population base relative to the land mass and its separation by considerable distance from

a range of biological invaders and the usual trans-boundary pollutants has, for instance, helped ensure a relatively muted impact on the domestic environment – though it is no longer quite so "clean and green" anymore. Notwithstanding the benefits of relative isolation, it is also important to acknowledge that, in part at least, the presence of a large agricultural sector means that New Zealand does stand out in sustainability terms when compared with OECD members. All of this does have a bearing on sustainability and, in particular, on the kinds of lessons that may be drawn from the New Zealand experience such that they have a wider application. Against this background, and in the context of the linkage between the reforms and the sustainable development of the wider agricultural sector, there are perhaps seven key political economy lessons to draw from the New Zealand experience.

First, ongoing political support is critical to the success of reform. This was a significant and salient feature of the reform process both in agriculture and in the wider economy with reforms being undertaken by a two-term Labour Government and then deepened and broadened by a National Government between 1990 and 1996.

Second, reform gathers its own momentum and indeed inevitability if there is a crisis. New Zealand was forced into the reform process by a clear sense of impending economic catastrophe. Simply put, it had to eliminate subsidies because it could no longer afford them. While "big bang" reform can work best under crisis conditions, such circumstances do not necessarily lend them to the best kind of planning for transitional assistance. The message therefore is that rather than wait for the crisis to hit, countries should already begin preparing for the inevitable and this forward planning will ease and speed up the transitional process.

Third, reforms are generally easier to implement when the Government implementing the reforms does not depend on the recipients of the subsidies for political support. The reforms in New Zealand were undertaken by a left wing government that had a thin rural constituency at best. It did not expect to lose political support, since there was only limited support extant for the Government in the rural sector. In any case, while it was not a popular programme, the Government was able to argue the case coherently and, in many cases, the depth (if not necessarily the pace) of the reform was supported by the farmers.

Fourth, the elimination of subsidies must be implemented according to an agreed and transparent timetable. Certainty of reform and its pace is essential for its success. New Zealand farmers were given clear signals about the pace, breadth and depth of the reform. This was vital to their overall success. A policy that is too gradual, like the planned next phase of CAP reform in 2012 for instance, is likely to fall prey to conflicting signals and vulnerable to capture by special interest groups. Notwithstanding this, transitional measures should be designed in sequence with the reforms. These must, however, be measures that assist the change, not delay it.

Fifth, sequencing is crucial. A holistic strategic overview of the reform process is required. Tackling a single sector in isolation may lead to increased suffering in that sector if other parts of the economy are not addressed simultaneously. In the case of New Zealand there were widespread reinforcing reforms in overall macro-economic management and micro-economic regulation, including measures which lowered input prices etc. Nevertheless, there were imperfections. The lowering of tariffs on inputs to farms did not proceed as quickly as the elimination of subsidies to the agriculture sector and this caused unnecessary hardship in terms of loss of income. In short, deregulation

needs to be multi-sectoral and effectively sequenced. New Zealand did not do this particularly well and prolonged the adjustment as a consequence.

Sixth, while quantitative work suggests that deregulation works best when countries deregulate multilaterally, the New Zealand experience strongly supports the view that unilateral reform and elimination of subsidies delivers substantive and worthwhile economic and environmental benefits.

Seventh, there is now a potent, if not new, weapon in the war against subsidies – their environmentally harmful effects. The New Zealand experience demonstrates that subsidies had a negative effect on the environment and that their removal has improved this situation. Analyses which outline these effects are not new and have been the feature of work undertaken by economists and by environmental scientists for some time now. What is perhaps "new" is that these concerns for the environment have found their way into trade negotiations. The impact of subsidies for fishing activity and the catastrophic state of global fish stocks, for instance, have resulted in the identification by members of the WTO of such subsidies as a specific issue for negotiation in the Doha Round. The aim of the negotiations in this area is to tighten the disciplines on these measures.

This suggests that there is good scope for a "connecting of the dots" process whereby the trade and economic concerns about subsidies are linked to the environmentally harmful effects of subsidies, such that a more powerful argument can be mounted for meaningful reform through the multilateral process. Moreover, the negative environmental effects of subsidies experienced in New Zealand do have wider applicability. They are real and they are significant. They are also common problems that exist in the US, Japan, Korea and in Europe, just as they did in New Zealand. Paying people to produce things the market is not demanding inevitably leads to wasteful use of scarce environmental resources.

This is not to suggest that the elimination of subsidies is the "silver bullet" and that there will be no environmental problems caused by agriculture in the absence of subsidies – there will. Environmental regulations will therefore still be needed to protect common water and soil values, but subsidy reform offers an important way of beginning the process of improving environmental outcomes. An important starting point in this process would be to improve policy coherence at home, ensuring for instance, that officials working on environment and agriculture issues are alerting trade negotiators to such problems thereby ensuring that the "dots" between the environmental and economic effects are being connected.

Conclusions

Two decades ago, New Zealand implemented wide-ranging general economic and environmental reforms. Government intervention in the economy, including agriculture, had led to severe misallocation of resources and high levels of assistance which could no longer be maintained. In 1984 and succeeding years, government assistance to agriculture was virtually eliminated, in some cases almost overnight. Underpinning the New Zealand reforms was the judgement that removing distortive price signals and addressing environmental "bads" was the first step before considering whether agriculture provides environmental "goods" that require government funding and assistance. The logic of the argument was that to do otherwise, i.e. to compensate farmers for perceived environmental "goods" without addressing the "bads", risked entrenching systems that

were having a negative impact on the overall sustainability of the sector and was just another way to subsidise farmers.

It is also worth underlining that there is little evidence of market failure in the provision of environmental "goods" by New Zealand agriculture. While agriculture does provide landscape amenities and *in-situ* preservation of biodiversity, these "goods" are by-products of agricultural systems and will continue to be provided regardless of payments from governments. If anything, the New Zealand experience suggests that government assistance to agriculture has had a negative effect on the supply of these goods, and the first step should be the elimination of such distortions.

In sum, the elimination of agricultural subsidies in New Zealand had a range of sustainable development-related effects. The economic and environmental effects were broadly positive and even those short-term negative social effects were relatively muted. The removal of subsidies triggered a sharp reduction in the national sheep flock with attendant benefits for erosion control, water quality and methane emissions. These were in part offset by the increase in other sectors, including the dairy and deer sectors. The net effect, however, was broadly positive across a range of indicators.

Moreover, the removal of subsidies also ensured that the development of marginal lands virtually ceased, forestry plantings continued to increase, and the use of fertilisers and other agricultural chemicals and pesticides stabilised. These changes have lessened the likelihood of the sector further degrading land and causing off-site contamination of water resources. Perhaps most importantly, the reforms have become self-reinforcing. Government assistance to New Zealand agriculture today is the lowest in the OECD – about €208 million, almost all of which is related to core public regulatory functions. This contrasts with the situation at the start of the reforms where such relatively non-distortive assistance accounted for less than 20% of the overall sum.

Taken in aggregate the reform process undertaken by New Zealand more widely has been critical to New Zealand's ongoing growth. Improvements in human capital development, increased international exposure (not least in trading terms), sharp reductions in the volatility of inflation and actual inflation and reductions in the size of the government administration have all been beneficial for New Zealand's per capita GDP growth. This has also improved the economy's resilience to economic shocks ensuring that, for instance, during and after the Asian crisis New Zealand's growth pattern was hardly affected.

Despite these far-reaching changes, environmental challenges remain. A number of agri-environmental measures require ongoing careful monitoring. The removal of subsidies was a necessary measure, but not sufficient in and of itself for addressing the environmental impacts of agriculture. This is now well understood in policy terms. In 1993, nearly a decade after the launch of agricultural reforms which removed many environmentally harmful subsidies, the New Zealand Ministry of Agriculture and Forestry released a position paper on sustainable agriculture. This formed one element in the Government's wider strategy on sustainable land management which is embodied in the Resource Management Act of 1991 (RMA).

Under the RMA, regional and district councils were charged with developing policies, in consultation with their communities, to address soil conservation issues, water quality monitoring and control, among other agri-environmental issues. Importantly, too the 1993 position paper defines sustainable agriculture in terms drawn from both the Bruntland Commission's 1987 report and the Rio Declaration of 1992. Specifically, the concept is

taken to mean the use of farming practices which maintain or improve the natural resource base, and can help ensure that any parts of the environment, influenced by agriculture, are financially viable, and allow people and communities to provide for their economic well-being.

The significance of this conceptualisation is underlined by a recent Growth and Innovation Advisory Board's (GIAB) survey that found that New Zealanders believe that economic growth alone may not fully describe their needs. The report indicated that New Zealanders are concerned about the *quality and durability* of growth, including in the agriculture sector – not simply its magnitude. Alongside this development has been the establishment in 2000/01 of the Sustainable Farming Fund. This is designed to contribute to improving the financial and environmental performance of land-based productive sectors.

One other important outcome of the subsidy elimination process has been the understanding that the achievement of sustained environmental benefits requires agricultural policies to be co-ordinated with other policies affecting macroeconomic conditions. The New Zealand experience has confirmed that the removal of agricultural subsidies is a critical step towards sustainability, but specific environmental policies designed in the context of social and economic policies continue to be necessary to address secure the sustainability not only of the agriculture sector, but of the wider economy of New Zealand.

Finally, seven political economy lessons were identified as having been critical to the removal of subsidies. Perhaps the least important at the time of the New Zealand reforms (the environmentally harmful effects of subsidies) was identified as having the potential to grow in importance, particularly in the context of negotiations on subsidy disciplines at the WTO. "Connecting the dots" between the environmentally harmful effects of subsidies and their social and economic effects is likely to become an increasingly powerful way of opening up a series of "new" fronts in trade negotiations and therefore in the wider effort to restrict and eliminate the use of such distortive measures. In this way, the global prospects for positive economic, social and environmental conditions – sustainable development for short – are more likely to be achieved.

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Chapter 4. Water Reform and the Agricultural Sector in Australia

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Introduction

In Australia, governments have historically been the principle investors in water and irrigation infrastructure. Government objectives were to open up new areas for agricultural development for economic and social benefits. Government involvement was necessary due to the size and scale of the investment required and the view that access to water was a common right of all Australians. As a result, irrigators were able to pay less than the real cost of water, leading in some cases to impacts including over-use, environmental degradation and inflexibility of water use.

Under the Australian Constitution, the management of water resources is primarily the responsibility of State and Territory governments. However, the national economic, social and environmental importance of water has made it an issue that requires national leadership and coordination. The National Water Initiative is the latest in a series of intergovernmental agreements between States, Territories and the Australian Government that set the path for Australian water reform.

There has been a move away from government subsidisation of water supply to full cost recovery, including transparency of community service obligation costs, relating price directly to water use and facilitating water trading. These measures have resulted in more effective price signals for water. Appropriate price signals enable water to be used where it is most valued, ensure that Australian farmers have greater flexibility to alter crop types to maximise farm income and provide incentives for improvements in water use efficiency, including for environmental uses.

Background

Under the Australian Constitution, management of natural resources rests with State and Territory governments. However, water traverses state boundaries, industries that use it operate nationally and water dependent ecosystems ignore administrative boundaries. The national economic, social and environmental importance of water has made water a national issue requiring national leadership and coordination.

Historically, water management and use in Australia has been dominated by a perception of water abundance. Over much of the last 150 years, governments issued water rights primarily to support economic development and regional population growth. Water was allocated to support domestic needs and, in the case of agriculture and industry, for productive use to contribute to the economic growth of the state and the

nation. However, obligations for the responsible use of water were not transparent and often ill-defined.

The 1994 Council of Australian Government Agreement on Water Reform was the first comprehensive national framework for improving water resource management. Since then, there has been substantial progress particularly in the areas of improved water planning and water use efficiency, water industry performance, providing environmental water, urban water pricing, accountability and community engagement in water resource management issues.

The 2004 Council of Australian Government agreement on a National Water Initiative is a further opportunity to progress water reform. The National Water Initiative has, at its heart, the objectives of a national approach to secure water entitlements, open water trading markets and assigning risks in sharing water resources between the environment and consumptive uses.

Drivers of reform

During the 1980s, issues of environmental health, sustainability, water availability and water quality for consumptive uses emerged as significant issues for the Australian public. By the 1990s, state governments had begun to adjust their water resource policies and management arrangements to take account of these new issues. At this time, water also became an issue on the national agenda. Symptoms of resource degradation such as declining water quality, increasing salinity, toxic algae outbreaks and the loss of biodiversity were widely publicised. At the same time, irrigators were facing reduced security of supply and demand for water had increased. The potential costs of enhancing or refurbishing water supply and wastewater management infrastructure also loomed large in government budgets. During the 1980s and 90s there was also a move in Australia toward economy wide microeconomic reform to help expand the economy's productive capacity.

In rural areas potential water scarcity and resource access competition was a driving force for reform. For example, an audit of water use in the Murray-Darling Basin in 1995 showed that if the volume of water diversions continued to increase it would exacerbate river health problems, reduce the security of water supply for existing irrigators, and reduce the reliability of water supply during long droughts. In the early 1990s, the Australian Bureau of Agricultural and Resource Economics (ABARE) estimated that the level of government subsidisation of irrigation in the Murray-Darling Basin was in the order of $300 million a year, indicating there was significant scope for efficiency gains through introducing a "user pays" principle for water and other reforms. In the same period, the value of agricultural production in the region was estimated at over $10,000 million a year. The cost of the effects of salinity on the quality of urban water supplies was estimated at around $65 million a year and cost of agricultural losses associated with salinity was estimated at around $37 million a year.

National water reform

Against this background, a national agreement on water reform was reached in 1994 through the Council of Australian Governments (COAG) and in 1996, the Murray-Darling Basin Ministerial Council agreed to "cap" the volume of water which could be

diverted from the rivers for consumptive uses. The cap has proven to be an essential first step towards achieving the objective of a sustainable Murray-Darling Basin ecosystem.

COAG agreed to a comprehensive water reform agenda that explicitly linked, for the first time, economic and environmental issues within a coherent and integrated package of reform measures. The agreement focused on establishing water allocations and entitlements separated from land and backed by secure access rights to water. It also provided for trading in water entitlements, making water available for ecosystems, as well as institutional reform, public consultation and education, and research.

In 1995, COAG agreed to include water reforms within the reforms associated with the National Competition Policy. Since then, the National Competition Council has progressively assessed all jurisdictions to determine if reforms to major sectors, including the water sector, are being carried out.

Based on the 1994 COAG agenda, there have been substantial achievements across all jurisdictions, including:

- pricing reforms based on full cost recovery and consumption-based pricing and independent regulation of government water businesses were introduced;
- water trading has expanded, particularly temporary water trading, with water moving to higher value uses;
- water management arrangements were developed to take account of the range of water uses – extractive uses, environmental needs, and the needs of stressed and overallocated river systems;
- better arrangements for examining proposals for new rural water infrastructure against the tests of economic viability and ecological sustainability were applied;
- water legislation to underpin the reforms was introduced;
- greater levels of accountability, transparency and reporting, particularly cross-subsidisation of community service obligations, were instituted;
- improved stakeholder consultation and community engagement was undertaken; and
- water access entitlements were separated from land titles – an almost revolutionary achievement in the context of Australia's historical treatment of water.

One of the main principles of the 1994 COAG water reform agreement was to achieve consumption-based and efficient pricing of water based on full cost recovery. Water entitlements were historically allocated by governments to irrigators for a minimal fee or, in some cases, at no charge. Most states operated on the basis of a fixed entitlement charge, which did not vary with consumption. Pricing reforms have resulted in a significant increase in charges for rural water over the past decade, with a move towards a two-part tariff structure that includes a fixed charge on entitlement held and a volumetric charge on the amount of water used.

However, wide variation existed in water reforms between regions and jurisdictions. Water users raised questions over the legal security of water entitlements. Governments and stakeholders identified that investment in new, more water efficient production systems was still being hampered by uncertainty over the long-term access to water in

some areas. Water markets had not reached their potential in scope or scale. Water trading was being hindered by the complexities of different water product specifications, cumbersome administrative arrangements in some circumstances, lack of up-to-date market information and the policies of some water corporations that restrict license holders from permanently trading water to other users outside the district. There was also considerable concern over the pace of securing adequate water for environmental purposes and for applying adaptive management arrangements to ensure the health of our river systems.

The National Water Initiative

COAG agreed to "refresh" the 1994 water reform framework by agreeing in 2004 to a National Water Initiative. The initiative recognised the continuing national imperative to increase the productivity and efficiency of Australia's water use, the need to service rural and urban communities and to ensure the health of river and groundwater systems by establishing clear pathways to return all systems to environmentally sustainable levels of extraction. It builds on the achievements of the 1994 COAG water reform framework and contains a number of actions that governments will implement over the next 10 years.

The National Water Initiative seeks to achieve:

- clear and nationally-compatible characteristics for secure water access entitlements;
- transparent, statutory-based water planning;
- statutory provision for environmental and other public benefit outcomes, and improved environmental management practices;
- the return of all currently overallocated or overused systems to environmentally-sustainable levels of extraction;
- progressive removal of barriers to trade in water and meeting other requirements to facilitate the broadening and deepening of the water market, with an open trading market to be in place;
- clarity around the assignment of risk arising from future changes in the availability of water for the consumptive pool;
- water accounting which is able to meet the information needs of different water systems in respect to planning, monitoring, trading, environmental management and on-farm management;
- policy settings which facilitate water use efficiency and innovation in urban and rural areas;
- addressing future adjustment issues that may impact on water users and communities; and
- recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource.

Challenges

The 1994 COAG agenda and the National Water Initiative provide the basis for further improving management and use of water across Australia. However, the future is likely to present ongoing challenges.

Water trading

An expanded water trading environment will generate new and ongoing issues. Under the National Water Initiative governments have agreed to establish compatible institutional and regulatory arrangements to facilitate intra and interstate trade, and manage differences in entitlement reliability, supply losses, supply source constraints, trading between systems, and cap requirements by 2007. Water trading aims to make water use more profitable and to encourage water to be used in higher value uses. It will also allow more cost effective and flexible water recovery for delivering environmental outcomes.

An expanded market that facilitates permanent and temporary trade in water entitlements, annual allocations and delivery capacity, and the development of new water products, will present great opportunities for irrigators to diversify, streamline and strengthen their businesses into the future. However, issues around social and regional impacts of permanent trade of water out of irrigation districts and economic costs of stranded assets still need work. There will be continuing pressure around the development and use of access and exit fees to manage impacts on water infrastructure, and ongoing issues around the use of exchange rates or tagged trading to manage differences in reliability.

"Unbundling" of water entitlements has now moved beyond the separation of water from land and into separate rights for each of the components of the water entitlement (including water allocations, site-use licences, and delivery capacity rights). The aim of unbundling is to further enhance the capacity of markets to operate efficiently, with more buyers and sellers in the market and reduced transaction costs. A number of factors including costs and the extent to which systems for registering the new components and accounting for transactions can be put in place will determine the extent to which "unbundling" and trading of water entitlement components is implemented

Future developments in the characteristics of water markets are still playing out. As water markets move towards maturity there will be increasing potential for the development of various derivative products of value to water users. For example, there may be forward options that allow future sale or purchase of water at an agreed price or forward options that allow for the future sale of the right to buy water on an agreed basis (where the buyer has the discretion to exercise the option at the time).

Other issues may develop between the rural and urban sectors as permanent water trading begins to increase. As full cost recovery pricing comes into effect and with growing demand for water in urban centres, there may be a trend for water to move predominantly from rural to urban areas, thus moving to where it achieves its highest price. With all the future possibilities around enhanced water trading, it will be essential to have very good monitoring and accounting frameworks around the effects (social, economic, environmental) and good predictive capacities to ensure that any potential negative impacts can be dealt with at the earliest possible opportunity.

Institutional frameworks

One of the key factors in achieving sustainable water management and use is the extent to which institutional frameworks are rigorous, sufficiently flexible and compatible, and able to support and drive Australia's water reform objectives. Institutional systems include regulatory, planning and assessment frameworks, and aligning organisations to deliver outcomes. The National Water Initiative provides for better institutional frameworks – it recognises that institutional separation is required for the roles of water resource management, standard setting and regulatory enforcement and service provision. It also focuses on best-practice institutional approaches and compatibility including in areas such as water plans and planning processes, water trading, water security and risks, water accounting, monitoring and reporting.

Winners and losers

Water charges have doubled on average in real terms from 1996 – 2004 as a result of the restriction on the amount of water available to irrigators and the requirement for irrigation water providers to achieve full cost recovery and implement two-part tariff pricing. However, the increased cost of water has provided an incentive for irrigators to increase their water use efficiency and they have benefited generally through increased reliability of supply.

Additional benefits are a reduced reliance on government subsidisation of water providers and increased ability for water providers to upgrade infrastructure through investment of their own revenue. Upgraded infrastructure can also help to increased water use efficiency of irrigators.

Importantly, significant ecosystem health benefits have been achieved through the reallocation of water from irrigators to the environment. For example, in NSW irrigation infrastructure has been used to deliver environmental water allocations to isolated wetlands on private properties. Periodic flooding of these wetlands has resulted in increased vegetation diversity and increases in bird diversity and numbers.

Conclusions

Water is a key part of Australia's natural capital serving a number of important productive, environmental and social objectives. The last decade has seen a focus on adaptively managing water resources for economic and environmental purposes, securing water access rights for users, expanding water markets and introducing more effective pricing policies and institutional arrangements.

Australia's market based approach to water reform has meant moving away from government subsidisation to allowing the creation of water markets and effective price signals for water. This has resulted in Australia's scarce water resources starting to be allocated to their highest value uses, including for ecosystem services.

The National Water Initiative process for resolving economic and environmental uses of water is a significant natural resource management decision. The 1994 COAG reforms, the National Water Initiative, and the framework for addressing the over-allocation of water in the Murray-Darling Basin, together provide a framework and working example of a way forward in achieving sustainable water management and use.

A strong commitment and ongoing cooperation of governments and stakeholders will be a key factor in sustaining and driving the momentum of water reform. Continuing efforts on integrated water management, cross-border cooperation, and improving irrigation practices and water use efficiency will be necessary to ensure continued productivity and environmental sustainability of water resources and secure access to water for all Australians.

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Chapter 5. Subsidy Reform in the Norwegian Fisheries Sector

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Introduction

Fisheries subsidies in Norway have a long and interesting history. In the first years after the Second World War the fisheries of Norway were quite profitable, and reserve funds were accumulated through levies on exports of fish. After a few years the fishing industry began to lag behind other industries in terms of productivity, and the funds were used to support declining incomes in the industry. Gradually the funds were depleted, and in the latter half of the 1950s the government began to provide financial support to the industry.

Initially government support to the industry was given on a year by year basis, in response to demands from the Federation of Norwegian Fishermen (*Norges Fiskarlag*), an interest organization comprising both boatowners and employees on fishing boats in Norway. In the beginning this support addressed what was regarded as an extraordinary emergency, but as it became clear that the bad times would not go away it was deemed necessary to deal with the issue from a longer time perspective. Two committees appointed by the government considered this issue in the late 1950s and early 1960s. The first, appointed in 1957 and concerned with the groundfish fisheries (*Torskefiskeutvalget*), emphasized the need for a fisheries policy which made it possible for the industry to make ends meet without subsidies from the government. It did, however, endorse a temporary support while the industry was solving its problems, but stressed that this support should be given in forms that promoted greater efficiency.

This notwithstanding, government support of the industry increased from year to year. A new committee was appointed and delivered its report in 1963. One of its recommendations was the establishment of a formal agreement between the government and the Federation of Norwegian Fishermen regarding government support of the industry. This support had up to that time been given on an annual basis, in response to difficulties that proved recurrent rather than transient. The committee felt that general procedures and guidelines for subsidies ought to be established, but that the purpose of this support should be to enable the industry to stand on its own feet. The committee saw the industry as being in need of a major restructuring in order to obtain incomes for labour and capital owners on par with other industries and considered economic support by the government as a means to achieve this restructuring. The committee stressed that subsidization of the industry must be temporary and extraordinary, to be provided in ways that over time would make itself redundant.

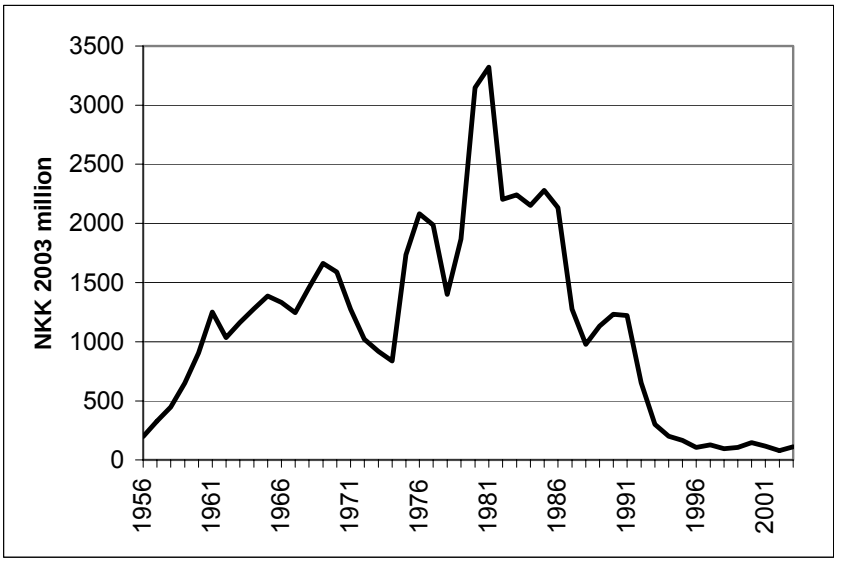
Such was not to be. The recommendation that there be put in place a formal agreement between the government and the Federation of Norwegian Fishermen was

heeded. In 1964 the Norwegian Parliament endorsed an agreement, usually referred to as the General Agreement (*Hovedavtalen*), with the Federation. This agreement gave the Federation a right to demand negotiations with the government whenever the revenues in the industry were insufficient to provide incomes for fishermen on par with comparable occupations. Far from making itself redundant, this agreement turned into a vehicle for a recurrent and for many years increasing flow of subsidies to the industry.

Figure 1 shows government subsidies to the Norwegian fisheries, from 1964 according to the General Agreement, in constant value of money. Far from making themselves redundant, the subsidies increased, with some ups and downs, to a peak in 1981, at which time they amounted to about 70% of the value added in the industry. The subsidies were 1135 and 1345 million kroner, respectively, in 1980 and 1981 while the remuneration to labour and capital was 1580 and 1877 million kroner.

Figure 1. **Government subsidies to Norwegian fisheries according to general agreement**

(From 1964 to 2001)



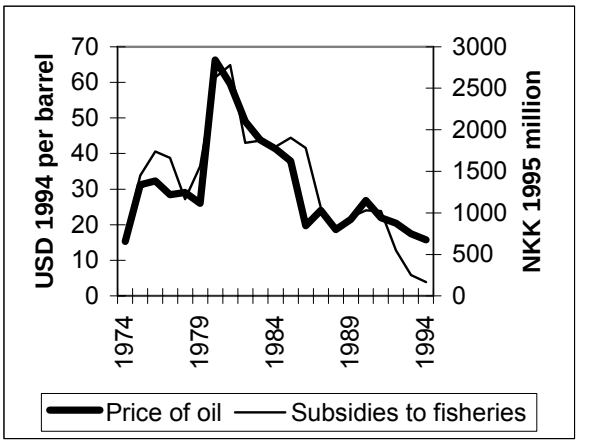
Source: Ministry of Fisheries, reports to Parliament on fisheries subsides, various years, and national budget documents.

What accounts for this development? Over time the Federation of Norwegian Fishermen developed considerable negotiating skills. It managed to sell the idea that the fisheries were about other things than just generating incomes for those who work there, such as keeping small fishing communities viable. Nevertheless, fishermen's incomes ought to be comparable with the rest of the economy. The difference was expected to be made up by the government. Several factors promoted this way of thinking. One was the subsidization, and protection through tariffs and import restrictions, of Norwegian farmers. Fishermen compare themselves in many ways to farmers; both industries are rural and both produce food, but in Norway the difference between the two is that fishing is based on favourable natural conditions while Norwegian farming is hampered by a cold and unfavourable climate. So, while the Norwegian fisheries are a major export industry,

farming in Norway needs protection from foreign competition in order to keep itself alive.

Fishermen did also get much help from the fact that Norway discovered an immense resource wealth from the late 1960s onwards in the form of oil and gas deposits in the continental shelf. The basic challenge faced by any country which makes such discoveries is how to turn such non-renewable resource wealth into a renewable wealth that may provide lasting benefits to the nation. For a surprisingly long time, however, the Norwegian debate on the oil and gas issue was dominated by how to absorb the very considerable revenues of the oil and gas extraction into the economy without generating problems such as high inflation and too rapid deindustrialization. There is little doubt that this resource wealth made Norwegian governments of shifting political hue more spendthrift than they would otherwise have been. In fact the correlation between the price of oil and the subsidization of the fishing industry was for many years astonishingly high (**Figure 2)**. It is not likely to have been caused simply by higher crude oil prices feeding into higher fuel prices and a greater "need" for subsidies; it is highly likely to have been associated with how much money the government thought it could afford to spend on various "worthy" causes, including fisheries subsidies.

Figure 2. **Price of crude oil and fisheries subsidies in Norway**



But, as we can see from Figure 1, the subsidies eventually came down, and the fishing industry is now again self-supporting. What did the subsidization accomplish? Most likely very little, except delaying the structural adjustments necessary to make the industry self sustained. In this paper we shall examine whether this is indeed true or not by looking at the investment and employment in the fishing industry and compare them with the subsidies. What we expect to see is subsidies encouraging investment (or discouraging disinvestment) and increasing the employment in the industry or retarding its decline.

The economic theory of fisheries tells us that subsidies to open access fisheries lead to depletion of fish stocks through encouraging investment and employment in the industry. There are some problems in verifying whether the Norwegian reality conforms to this. The theory presupposes open access to fish stocks and no limit on the catch. After the establishment of the exclusive economic zone in 1977 most stocks exploited by Norwegian fishermen came under a total quota regime. For some stocks, Northeast Arctic

cod for example, this quota regime did not become fully effective until the early 1980s because the Norwegian coastal fleet could continue fishing even if the Norwegian share of the total quota had been taken. Hence, after 1980 or so, there is little reason to expect the subsidies to have had much effect on the stocks, provided the quota control has been effective. Any excessive investment in boats and employment of labour would under those circumstances have had the effect of shortening the fishing season, as is well known to have happened in other places where there have been restrictions on the total catch but no individual quotas or restrictions on participation in the fishery. Indirectly, however, there may have been an effect, through pressure from an industry with excessive capacity for larger quotas in order to keep the propellers turning.

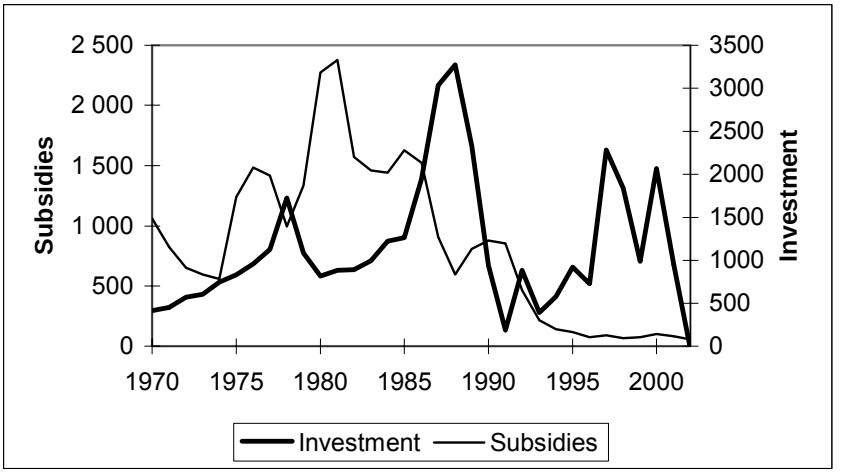
The other reason why it may be difficult to find a connection between Norway's subsidies and the status of the fish stocks is that almost all stocks exploited by Norwegian fishermen are also exploited by fishermen from other countries. Hence, the status of these stocks is as much determined by what the fishermen and the governments in these countries do as by what the Norwegian government and the Norwegian fishermen do. Therefore, what may appear as an effect of Norwegian subsidies may have been caused by some other country. We do not have the necessary data from other countries to pursue this question but shall nevertheless contrast the development of the Northeast Arctic cod, the most important stock exploited by Norwegian fishermen, with the development in subsidies, as the cod fisheries got the major part of the fisheries subsidies.

Finally, all subsidies need not be bad for the development of the industry. The two committees that dealt with the Norwegian subsidies over forty years ago envisaged them as tools to restructure the industry and make it self-supporting. That effect was long in coming, if at all present, for the industry as a whole, but does not preclude that some subsidies did have such an effect for parts of the industry. The decommissioning grants to the purse seine fishery are an example of that and one which we shall look into.

Investment and subsidies

Figure 3 shows gross investment in fishing boats and the fisheries subsidies since 1970. There is no positive correlation between the two, and the diagram suggests a negative one, which is however insignificant. From this it would seem that the subsidies had no effect whatsoever on the investment in fishing boats. This is not what we would expect. One possible explanation is that the subsidies affected mainly certain segments of the industry; the industry consists of different fisheries which exploit different stocks and use different technologies. It is often the case that one segment of the industry is doing well while another is in trouble. Since the subsidy regime was designed to mainly affect those who were in trouble it is possible that the effect of subsidies gets lost in the noise from other effects.

Figure 3. **Fisheries subsidies and gross investment in fishing boats**

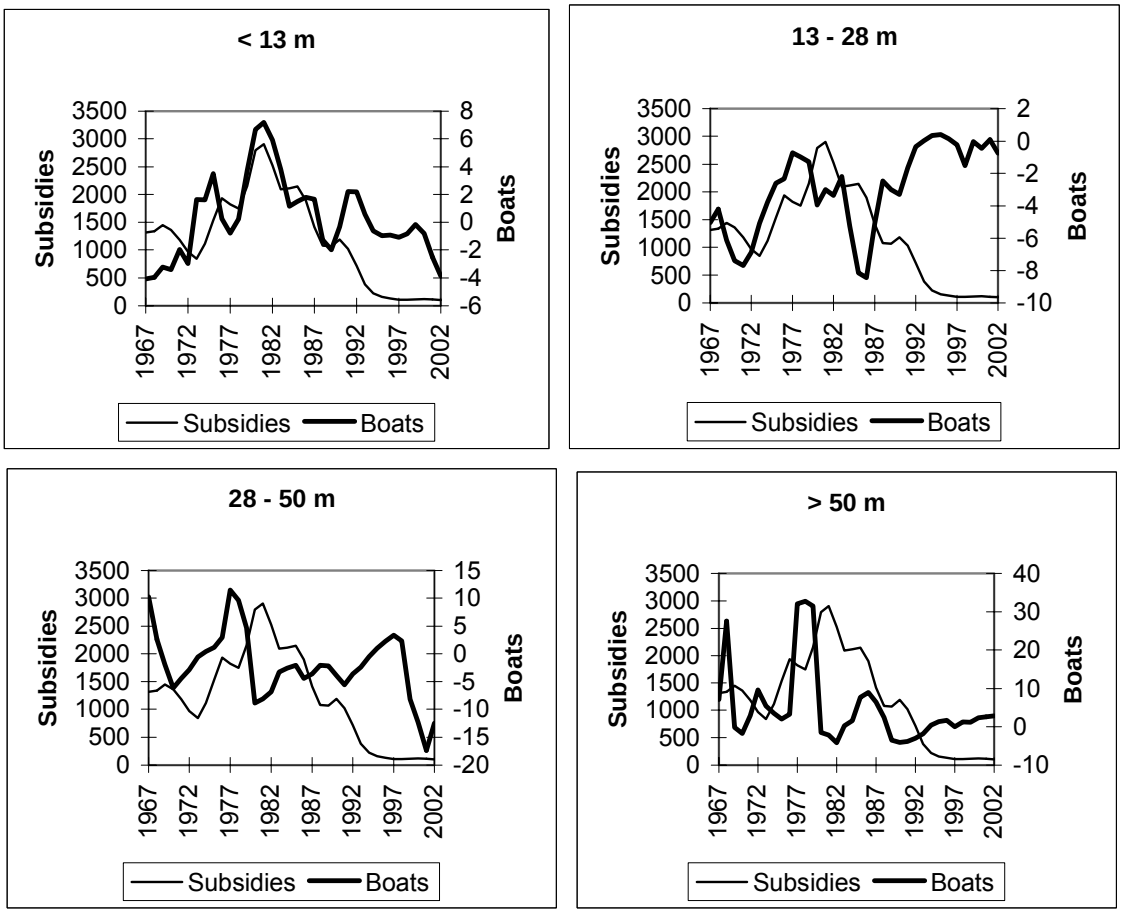


Source: Statistics Norway.

There is no time series available on investment in different types of fisheries, but we do have information on the number of fishing boats by size group and by year of construction. The change in the number of boats is likely to be a good proxy for the investment. **Figure 4** shows the change in the number of registered boats in different size classes and the fisheries subsidies. Both series have been smoothed by taking a three-year moving average. There are two reasons for this. First, one would expect that the effect of subsidies on investment would occur over some time and that persistent subsidies would have a greater effect than transient ones. Second, there have been two changes in definitions of the size groups over the period, which may have shifted some vessels from one size group to another.

Figure 4**. Fisheries subsidies and change (%) in the number of boats in different length groups**

(Three Year Moving Average)



Source: Statistics Norway and Directorate of Fisheries.

Judging from Figure 4 there appears to be a quite close correlation between the subsidies and the change in the number of boats less than 13 meters. For the next two groups (13 - 28 and 28 - 50 meters) this correlation is less obvious and, what is more, it appears that the investment in boats leads the level of subsidies and not the other way around. We usually think of subsidies as stimulating investment, so if anything subsidies should lead investment, partly because it takes time to make a decision to invest and to have the boat built. The opposite causal relationship is not inconceivable, however. Investment in boats which were not really required would not have added anything to the total revenue in the industry while the total costs would have increased, reducing overall profits in the industry. Since the subsidies were supposed to be based on the annual cost and earning studies of the fishing fleet, excessive investment could with some time lag have given rise to higher subsidies. After the late 1980s, when the subsidies were on their way to virtually disappear, whatever relationship there may have been between subsidies and investment for these vessel groups disappeared; there has been a substantial growth in this fleet segment since the late 1980s.

For the remaining group (over 50 meters) there is even less of a relationship between subsidies and the number of vessels. We may note, however, the investment peak occurring in the late 1970s. This was followed by a subsidy peak in the early 1980s. This development is consistent with the explanation that investment in new boats led to lower incomes through declining catches per boat and higher costs, leading to an increase in the "need" for subsidies.

The fact that the subsidies seem primarily to have led to investment in small boats is not entirely surprising. Much of the subsidies went to the groundfish sector fishing cod and similar species. The small craft are primarily engaged in this fishery. This is also the fleet segment where entry was easiest; the capital needed is relatively small. The fact that the largest boats are also the most expensive ones and investment in these boats was apparently not very sensitive to the subsidies could explain why we did not find much of a relationship between the gross total investment in fishing boats and subsidies.

The change in the number of boats from year to year is a net investment, being the result of additions to and removals from the registry of fishing boats. It is possible that figures on gross investment would be more appropriate to use, as some boats might not be removed from the registry until well after they have been taken out of use. **Figure 5** shows the number of new boats. This ought to come close to representing gross investment in boats. For boats less than 30 meters there appears to be a connection between the number of boats and subsidies, but for boats over 15 meters the number of boats appears to lead subsidies and not the other way around. This is not consistent with subsidies causing the change in the number of boats but rather with overinvestment in boats increasing the "need" for subsidies, as earlier discussed. For boats over 30 meters there appears to be no relation between subsidies and the number of new boats built.

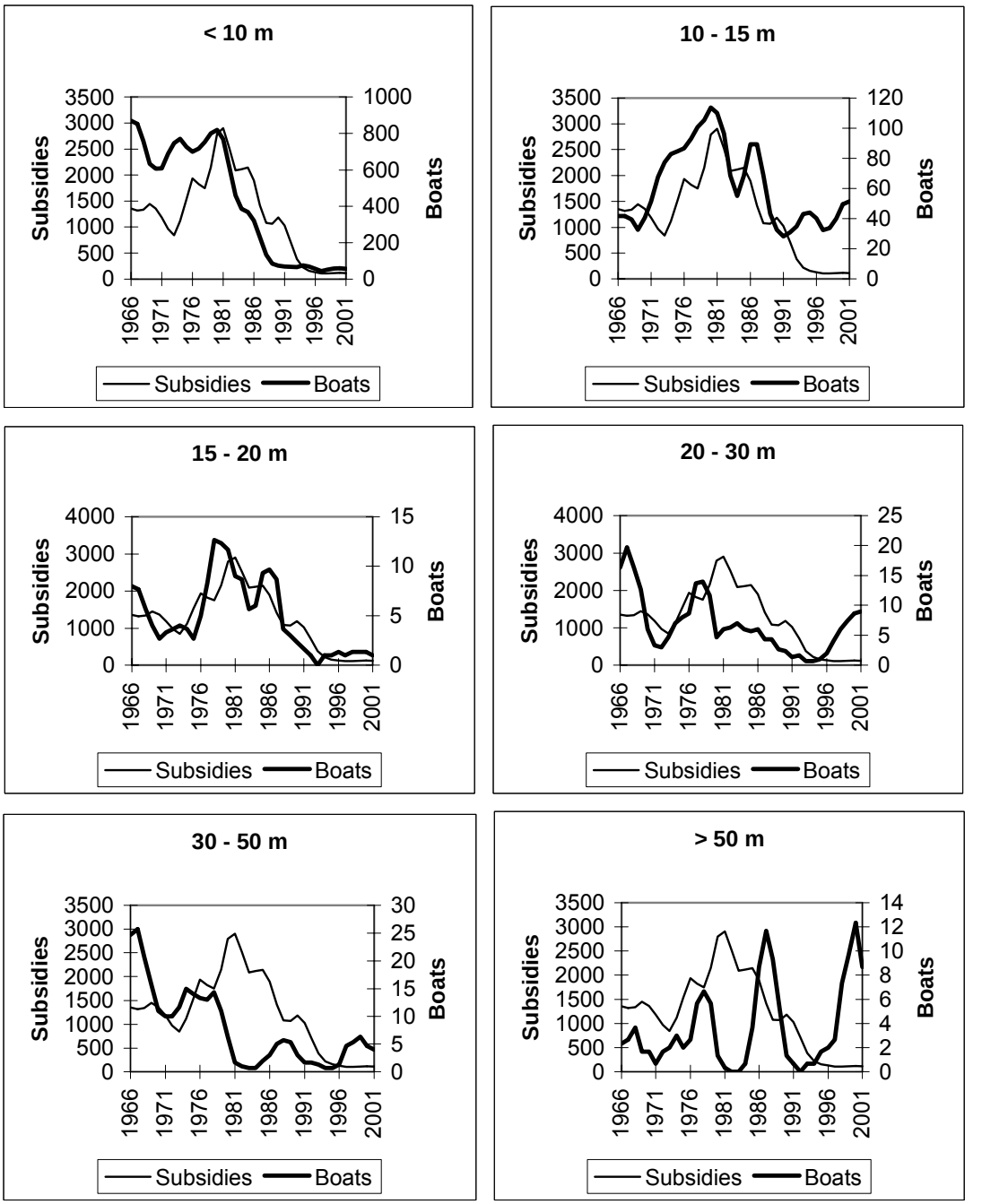
Hence subsidies do not appear to have caused investment in new boats, except for the smallest ones, and there is some indication of the reverse causality, namely that investment in new boats has led to more subsidies a few years down the road.

But there are different kinds of subsidies. Some were price subsidies, others encouraged scrapping and selling of fishing boats, and yet others subsidized investment in fishing boats by outright grants and subsidization of interest payments. Over the years there have been investment grants and interest subsidies paid to the fishing industry in addition to the subsidies based on the General Agreement. These investment subsidies have been paid through what used be the Government Bank for Fisheries (*Statens Fiskarbank*), which in 1996 was integrated into the Government Bank for Rural Development (*Statens districts -og utviklingsfond*). **Figure 6** shows the investment subsidies to the fisheries channelled through these two institutions since 1976. These figures may be incomplete for the years up to 1991, and there may have been such subsidies prior to 1976, but this awaits further investigation. The figure also shows the subsidies based on the General Agreement. In relative terms the investment subsides were of minor importance until the 1990s, when the General Agreement subsidies fell to a very low level.

Figure 7 shows the investment subsidies and the number of new boats (the time series have not been smoothed in this case). These subsidies were highest in the early 1990s, but do not appear to have had any effect on investment at that time. In the late 1990s, after the ordinary subsidies virtually disappeared, a relationship can be detected between the investment subsidies and investment in boats over 20 meters and in the 10-15 meter group. In the late 1970s the investment subsidies apparently mainly stimulated investment in small boats (less than 20 meters).

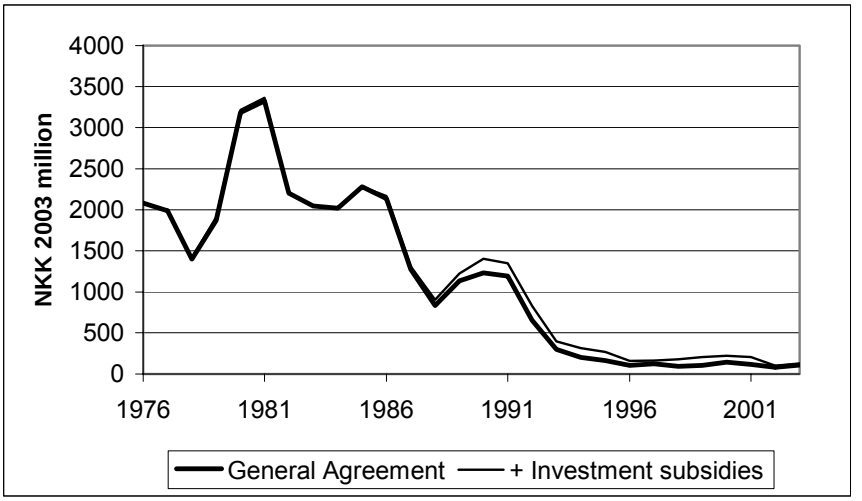
Figure 5**. Fisheries subsidies and the number of new boats in different Length Groups**

(Three year moving average)



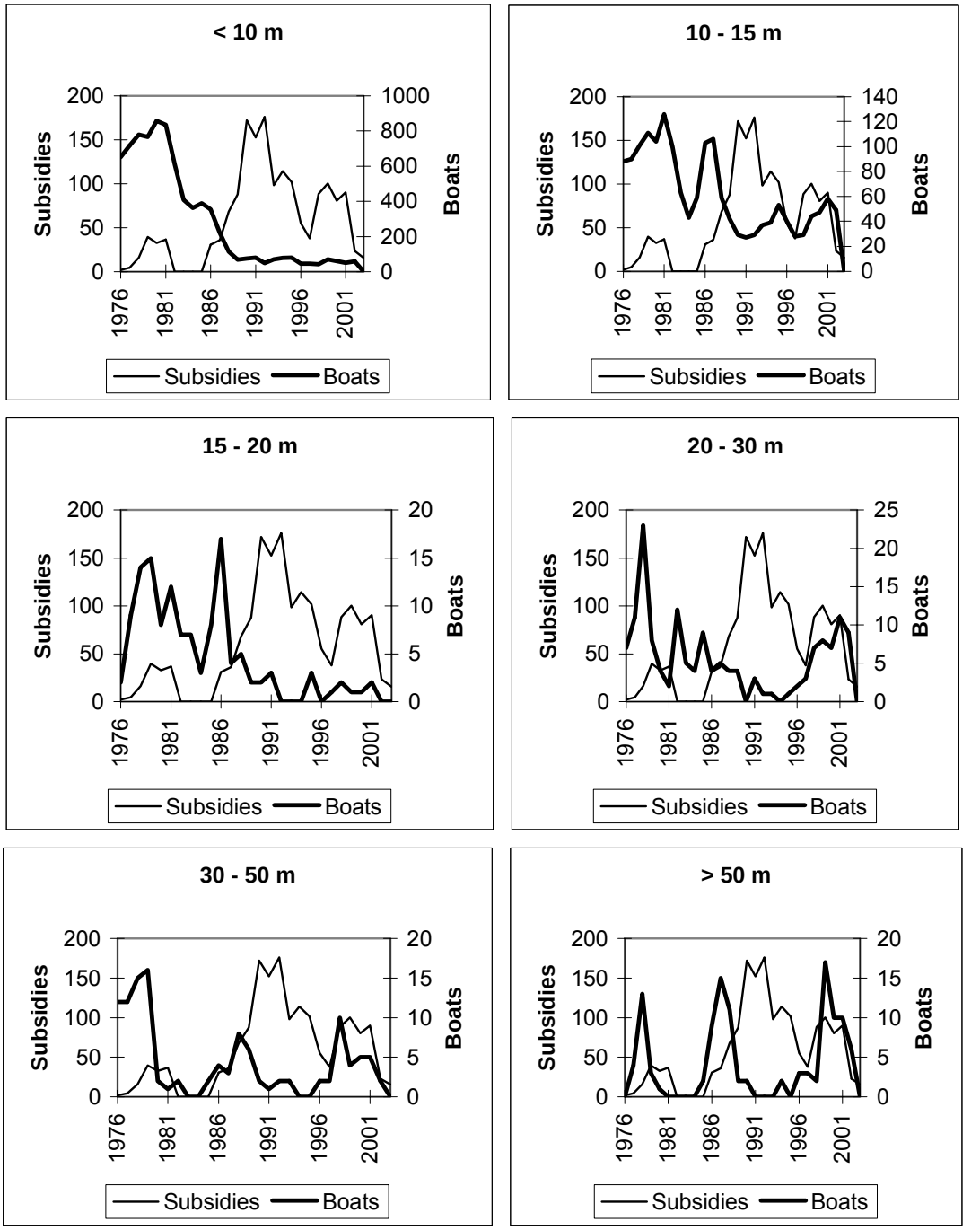
Source: Statistics Norway and Directorate of Fisheries.

Figure 6**. Subsidies according to the general agreement and investment subsidies through government banks**



Source: Minstry of Fisheries, annual government budget (St. meld. nr. 1), various years.

Figure 7.**Investment subsidies and the number of new boats in various size groups**



Source: Statistics Norway and Directorate of Fisheries.

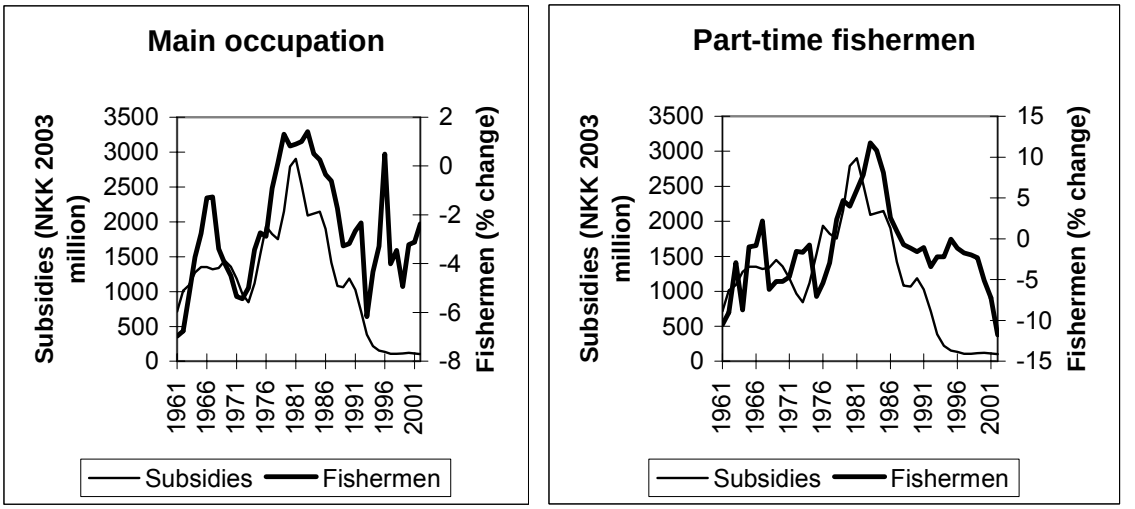
Subsidies and employment

In Norway there is a registry of fishermen. This registry keeps track of whether fisheries are a partial or a major source of income. In 1982 the registry was revised and the definitions changed, and so the numbers before and after are not comparable, strictly speaking, and numbers for 1982 are missing. We have dealt with this by looking at the change in the number of fishermen from year to year, interpolating the change between 1981 and 1983. Partly for this reason, we have looked at a three-year moving average, both for the change in the number of fishermen and the level of subsidies. Furthermore, as for investment, the effect of subsidies on the number of fishermen should be expected to be spread over some time, and persistent subsidies are likely to have more effect on the growth in the number of fishermen, or on slowing their decline, than transient ones.

Figure 8 shows the level of subsidies, in constant value of money, and the change in the number of fishermen, both part-timers and those with fishing as the main source of income. The subsidies appear to have slowed down the decline in the number of fishermen of both categories. After the subsidies virtually disappeared in the 1990s there is little connection, however; the number of part-timers declined steeply around 2000 while the number of fishermen with fisheries as the main source of income continued to decline, albeit at a quite variable annual rate.

Figure 8. **Fisheries subsidies and the change in the number of fishers with fisheries as main source of income**

(Three year moving averages)



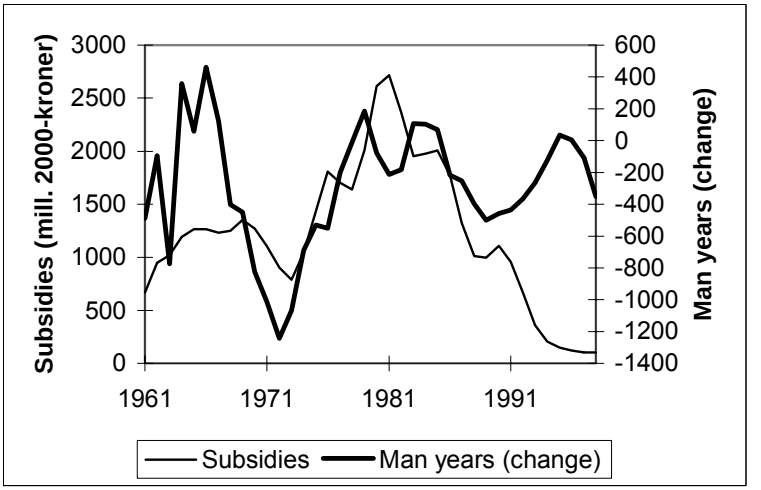
Source: Statistics Norway: Fisheries Statistics and Ministry of Fisheries, annual budget documents and reports on fisheries subsidies, various years.

The number of registered fishermen is a crude estimate of the use of labour in the fisheries. Statistics Norway has estimated the input of labour in the fishing industry. **Figure 9** shows the fisheries subsidies and the change in the use of labour in the fisheries (3-year moving averages). It tells much the same story as Figure 8; the subsidies appear

to have slowed down the decline in the number of man years up until the late 1980s when the subsidies began to decline.

Figure 9. **Fisheries subsidies and the number of man years (change) in fisheries**

(Three year moving averages)



Source: Statistics Norway: Fisheries Statistics and Ministry of Fisheries, annual budget documents and reports on fisheries subsidies, various years.

Hence it appears that the subsidies slowed down the decline in the use of labour in the fisheries and even reversed it in some years. This accords with the previous finding that the subsidies stimulated investment in small boats. These are the most labour-intensive boats in the fishing fleet.

Subsidies and fish stocks

Did the fisheries subsidies lead to overexploitation of fish stocks? The collapse of the Atlanto-Scandian herring stock is well known but happened in the late 1960s, before the fisheries subsidies really took off. This collapse has been attributed to technological leaps (the power block, the sonar) which occurred over a relatively short period of time, together with the vulnerability implicit in the schooling behaviour of the stock and the fact that access to the stock was open. Change in ocean climate may also have had something to do with this.

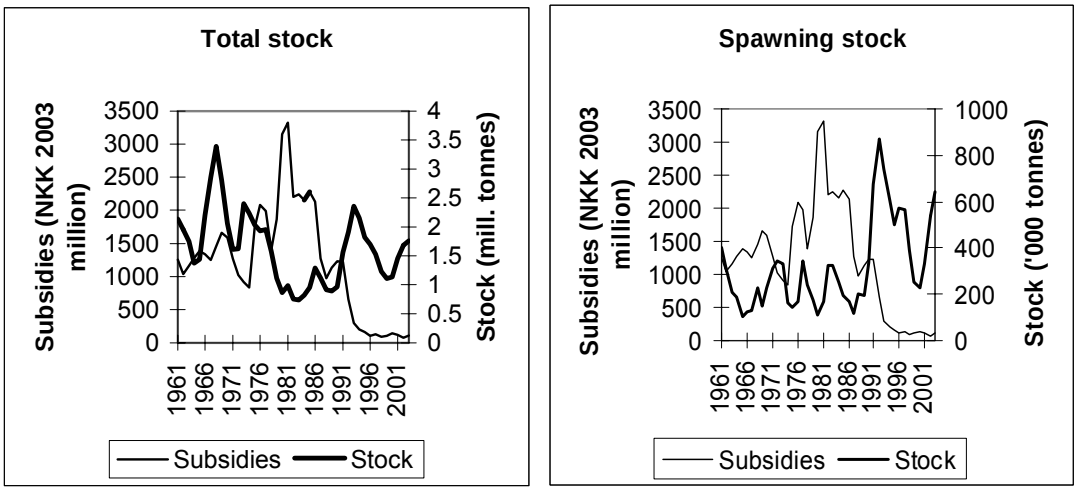
There is more reason to expect the Northeast Arctic cod stock to have been affected by the subsidies. This stock is the most important one economically in the Norwegian fisheries, and the cod fisheries probably got the shark's share of the subsidies. It is worthwhile, therefore, to examine whether there is any connection between the subsidies and the depletion of the stock.

As already mentioned, from about 1980 this stock has been controlled by a total catch quota, so any effect of subsidies would be expected to have occurred first and foremost

before that time. The high subsidies in the late 1970s and early 1980s may have caused some decline in the stock. Since the exploitable stock consists of several year classes, any overexploitation caused by subsides would have had repercussions over several years. The stock was in decline from the early 1970s to the late 1980s, with a brief recovery in the mid-1980s. As discussed earlier, the stock is influenced as much by foreign catches as Norwegian, besides being subject to environmental fluctuations, so it is not easy to conclude that the said decline was caused by the Norwegian subsidies, but this development is certainly consistent with that hypothesis. After the subsidies almost vanished in the 1990s the stock has been in a slightly better condition than during the high subsidy period. Note, however, that the absence of subsidies would have had only an indirect effect in this latter period, owing to the total catch control.

It can be argued that the Norwegian subsidies would have primarily affected the spawning stock, since this part of the stock is primarily exploited by Norway (the spawning takes place in the Norwegian EEZ). **Figure 10** also shows the Norwegian fisheries subsidies and the spawning part of the Northeast Arctic cod. Up until about 1990 the spawning stock fluctuated without much of a trend, but since that time the spawning stock has been substantially larger than previously. The subsidy spree in the 1970s and early 1980s does not appear to have caused any unprecedented decline of the spawning stock.

Figure 10. **Fisheries subsidies and the Northeast Arctic cod stock**



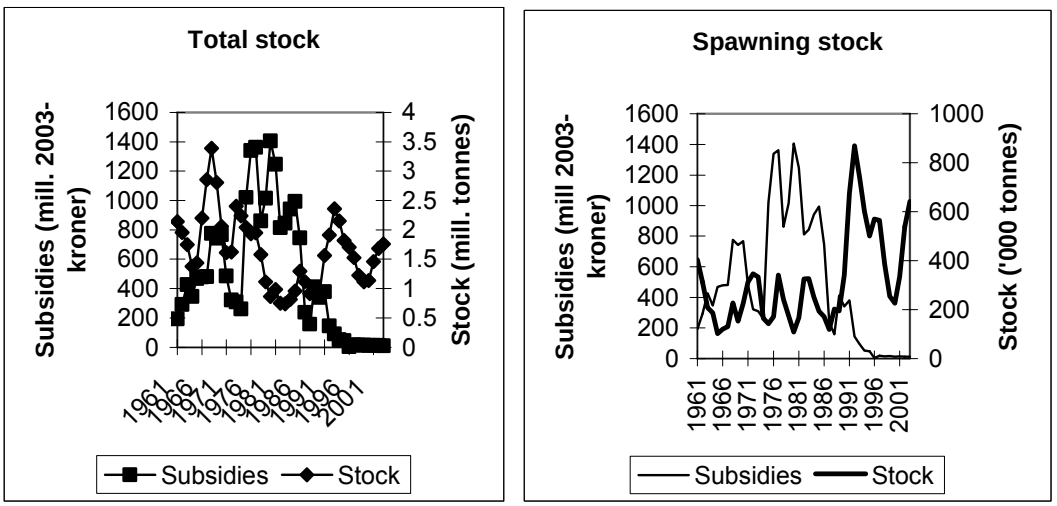
Source (for the cod stock): ICES, Report of the Arctic Working Group 2004, Table 3.24.

The recovery of the spawning stock that took place in the 1990s coincided with the winding down of the subsidies. It is, however, highly doubtful whether there is in fact any causal relationship here. The fishery on the spawning stock was subjected to an unprecedented and harsh regulatory regime in 1989-1991, with very small catch quotas. The background for this was a perception of an all time low of the spawning stock and the disaster of the Northern cod of Newfoundland, an event which the Norwegian government was loath to repeat in its own backyard. With hindsight it now appears that things were not quite as bad as they appeared at the time.

The subsidy figures we have been looking at include all subsidies based on the General Agreement. As stated, most probably went to the cod fisheries. It is possible to identify some subsidies that went specifically to the cod fisheries. These are price subsidies targeted to cod and similar fish as well as subsidies to bait and bait stations. **Figure 11** shows these subsidies, together with the development of the stock of the Northeast Arctic cod. The pattern of the subsidies specifically targeted at the cod fisheries is not very different from the total subsidies, and there are no different conclusions to be drawn.

So, to sum up on stocks and subsidies, there is some indication that the subsidies in the 1970s and early 1980s did encourage heavier exploitation and a decline in the stock, but this effect is not particularly strong. Needless to say this should not be taken to mean that subsidies are of little consequence for fishing effort and fish stocks; the problem is rather that these influences are difficult to detect for stocks that are subject to very substantial environmentally-driven fluctuations as well as exploitation by other countries which may have followed totally different policies.

Figure 11. **Subsidies targeted at cod fisheries and Northeast Arctic cod stock**



Source (for the cod stock): ICES, Report of the Arctic Working Group 2004, Table 3.24.

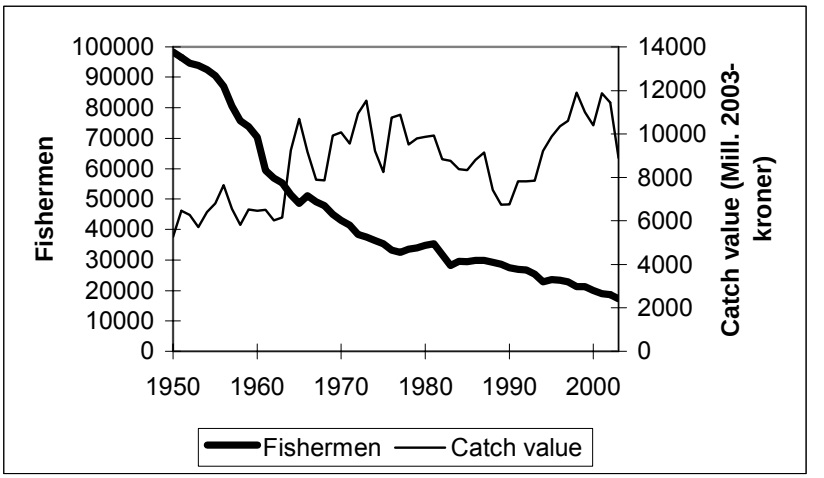
Some long term tendencies in Norway's fisheries

Figure 12 shows the development of the catch value, in constant value of money, and the number of fishermen in Norway since 1950. While the catch value has roughly doubled, the number of fishermen has declined by about 80%. Together these changes imply that the catch value per fisherman is now about ten times what it was in 1950 (**Figure 13**).

What would have happened if the number of fishermen had remained the same? The fish stocks in the Norwegian EEZ and nearby waters have long been fully exploited and perhaps overexploited; there is no way that the value of the catch could have been increased beyond what it now is. The catch value per fisherman would have been a

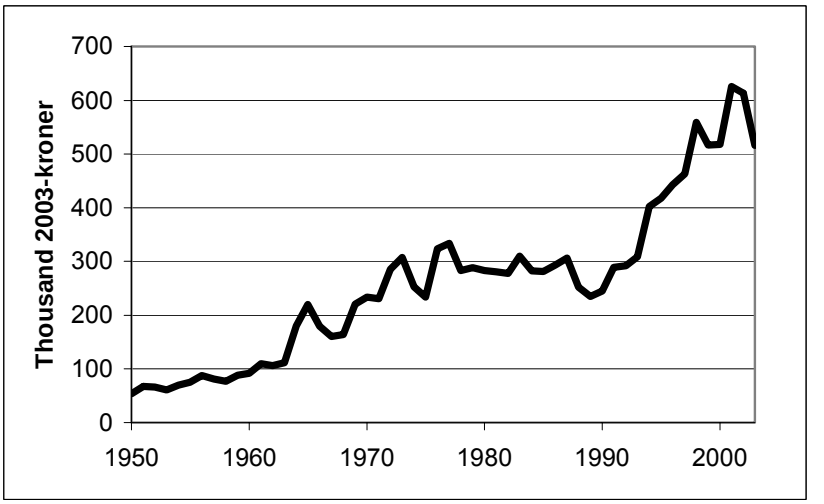
fraction of what it now is, depressing fishermen's incomes below any reasonable level compared with other comparable occupations. Needless to say, this would never have happened. Yet this example is useful to illustrate how fishermen's incomes can be maintained in an economy where productivity and incomes in other sectors are growing. The productivity in fisheries which have long since reached the limit of what the fish stocks can support can only be increased by a technological improvement which maintains revenues in the industry while the number of fishermen declines.

Figure 12. **Catch value and the number of fishers in Norway (part time workers included)**



Source: Statistics Norway.

Figure 13. **Value of catch per fisher in Norway**



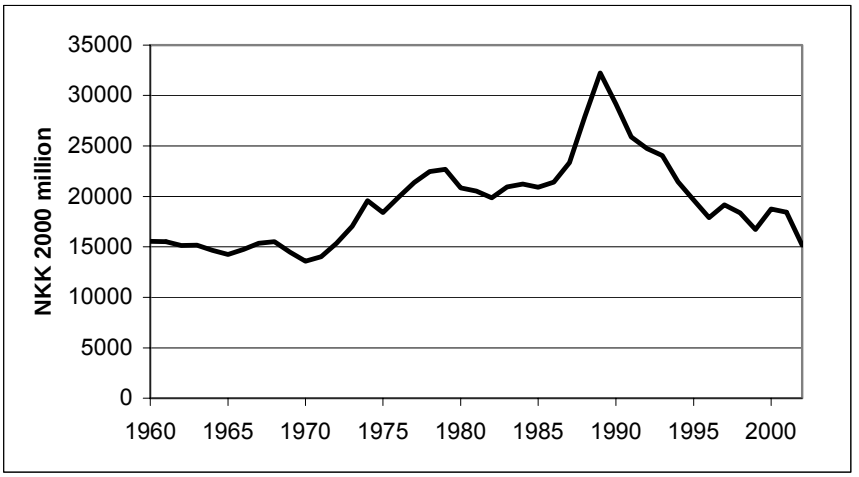
Source: Calculated from data in Figure 12.

In Figure 12 we may note that the number of fishermen increased slightly in the late 1970s and early 1980s when the subsidies were at their peak. Here we see again (cf. Figure 8) how the subsidies retarded the necessary structural changes in the industry. From Figure 13 we see how the catch value per fisherman stagnated in the late 1970s and throughout the 1980s, despite the very substantial subsidies, much of which was given in the form of price support which bolstered the value of the catch. Or perhaps it was because of and not despite the subsidies that the catch value per fisherman stagnated, due to a slowdown in the structural changes in the industry.

After the subsidies practically vanished in the 1990s the catch value per fisherman grew handsomely, up to about 2000. Possibly we see here an inverse relationship between subsidies and productivity; as already alluded to several times, subsidies are likely to impede the structural changes that are necessary to maintain the productivity increase in the industry, which ultimately is what allows fishermen's incomes to increase on par with incomes of people in comparable occupations. While improved catches and prices undoubtedly had much to do with the favourable development in the 1990s, the income per fisherman would not have risen quite so handsomely unless their number had continued to fall.

What, then, accounts for the increased productivity of fishermen despite fully or overexploited stocks? It is tempting to think of an increase in real capital. **Figure 14** shows the development of real capital in Norway's fisheries since 1960. Surprisingly, perhaps, the real capital is no greater in the industry now than what it was in the early 1960s, having reached a peak in the 1980s, but since the number of fishermen has fallen, the real capital per fisherman has increased. To those versed in the theory of economic growth the limited rise in real capital is perhaps not so surprising, however. One lesson of growth theory is that the most enduring source of economic growth is technological progress rather than accumulation of capital. One million kroner, corrected for the change in the value of money, buys a totally different and more productive equipment today than it did thirty or forty years ago.

Figure 14. **Real capital in Norwegian fisheries**

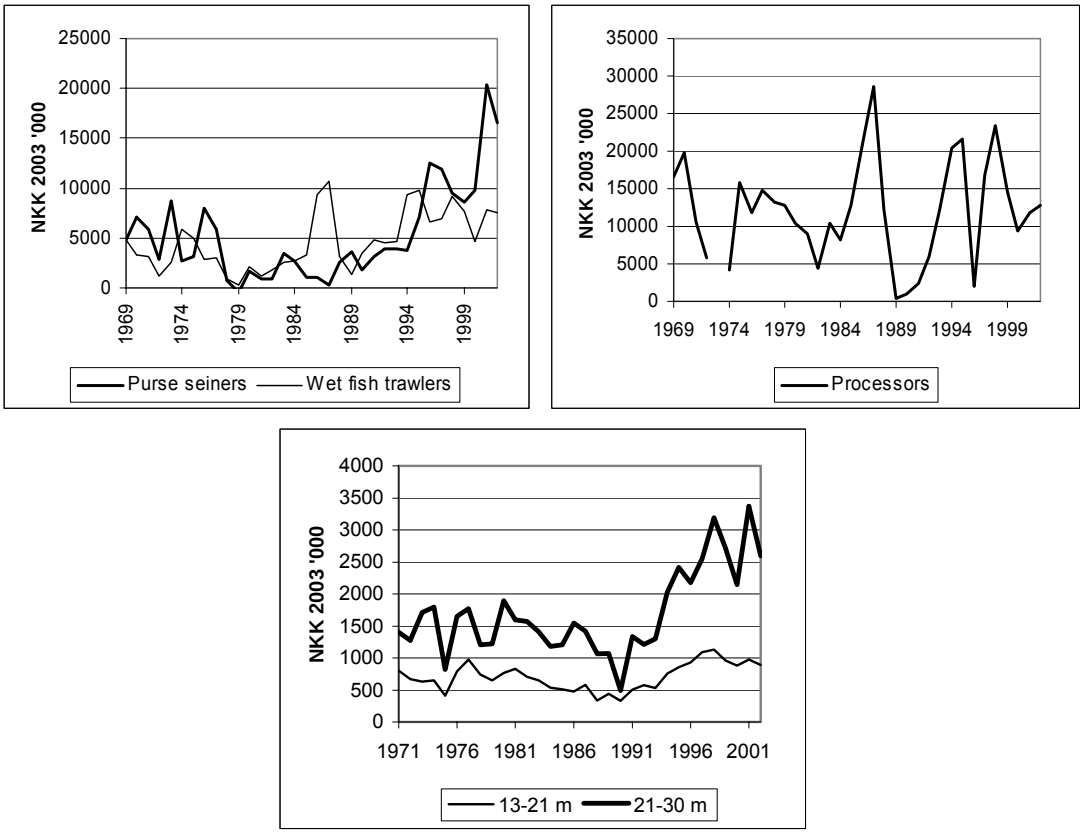


Source: Statistics Norway.

What has happened to the profitability of the fishing fleet? The longest time series available is the one on potential wage (*lønnsevne*). This is the residual one gets after subtracting all costs, including capital costs but excluding the cost for the crew, from the revenues. Preferably this ought to be expressed per man-year or some other unit of labour input, but the publication of this series was discontinued in the 1990s. What we do have is potential wage per boat, and for boat groups that consist of fairly similar boats over the time period considered this is probably an acceptable measure of how the profitability of the fleet has developed. Note that in principle all capital costs have been subtracted, but there have been some changes in the calculation of capital costs over the years, among other things of the calculation of the opportunity cost of equity. The potential wage should thus cover both the crew wage and any excess profit, or the opposite. The boat groups we shall look at are large purse seiners, large wet fish trawlers, trawlers with on-board processing facilities, and boats 13-21 meters and 21-30 meters.

Figure 15 shows the potential wage of these five groups of fishing vessels. Before the mid-1990s the potential wage of large purse seiners and wet fish trawlers were not all that different, but after that the purse seiners have pulled away and their potential wage has increased. We will return to the purse seiners in the next section. For the wet fish trawlers there has been only a moderate increase in the 1990s. The potential wage of trawlers with onboard processing facilities has varied enormously but without much of a trend. These vessels are also the most capital intensive ones and thereby the ones where fluctuations in catch value can be expected to produce the largest variations in the residual we get after subtracting all costs other than labour costs. For the 21-30 meter boats we see a handsome increase in the potential wage in the 1990s, but negligible for the smaller boats. We may recall the finding above that after 1990 there has been a considerable investment in boats above 20 meters, which on this background could be explained by an improved profitability.

Figure 15. **Potential wage for various groups of Norwegian fishing vessels**



Source: Directorate of Fisheries: Cost and earnings studies.

Restructuring subsidies

Elsewhere it has been emphasized that the detrimental effect of subsidies in fisheries depends critically on how well the fisheries are being managed. With effective management, subsidies would not lead to stock depletion but only to increasing costs of fishing. And with a management regime like ITQs subsidies would only bolster the profits of boatowners or crew, and possibly both, as the former would have a strong incentive to keep costs down in any case.

Under effective fish stock management, one can go a step further and maintain that subsidies could be used to promote the restructuring of the fishing fleet, provided they are temporary and do not leak back into the industry. Over the years the Norwegian government has used such subsidies with at least a partial success. The first buy-back program began in 1979 and went on until 1995. Over this period slightly over one billion kroner, in a current value of money, was spent on the program. About one-half was spent on the purse seiners. The program appears to have had greatest success for this fleet segment, and we shall begin by describing the effects of the program for this fleet

segment in some detail. **Table 1** shows how the buy-back money used in 1979-95 was spent.

Table 1. Total expenditure on buy-backs

(1979-1995)

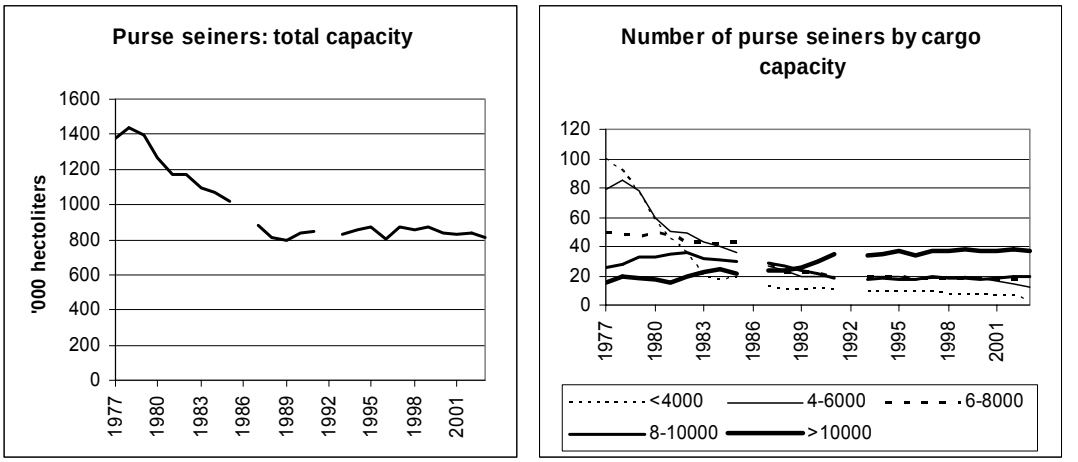
	Mill. kroner	*No. boats*
Coastal fleet	324.0	706
Sprat	6.3	26
Whaling	3.2	10
Trawling for pelagics	65.0	57
Trawling for cod	146.2	28
Purse seiners	449.7	102
Sealing	12.5	12
Small trawlers	10.7	4
Shrimp trawlers	2.3	1
Other	18.3	
Total	1,038.2	946

Source: Statens Fiskarbank

The reason why the buy-back program worked well for the purse seiners lies in the way this fishery is regulated. After the collapse of the herring stocks around 1970 this fleet was put under a licensing regime. All boats above a certain size (90 feet or 1 500 hectolitres cargo capacity) were required to have a specific license, a "concession" which stipulated their cargo capacity. Soon after, the most important stocks fished by these boats were put under a quota regime. The quotas were split into individual units determined by the concession capacity of the vessels through a certain allocation rule. There were, however, far more vessels than were needed to take the permitted catch. Furthermore, there are economies of scale in this industry, with large vessels being more profitable than small ones, at least up to a certain limit and provided they can be used to their full capacity.

Although the concessions were originally meant to be transferable only to the next of kin, in practice they quickly became transferable without restrictions. The economies of scale meant that it was profitable to buy the concession of a small boat, add it to one's own boat and then buy a new boat with the combined concession capacity of the former two. The buy-back program helped in two ways. Some boats were bought out of the fishery and their concessions annulled, which raised the quotas of the boats that remained in the fishery. Some boatowners were given grants to facilitate the scrapping of their boats, while they could sell their concessions to other boatowners. This brought about a structural change towards fewer and lager, more profitable vessels. This development is traced in **Figure 16**. The total fleet capacity started to fall immediately after the buy-back program was initiated (1979). The number of small purse seiners (less than 6000 hectoliters cargo capacity) fell while the number of large purse seiners has increased, a result of utilizing economies of scale.

Figure 16. **Purse Seiners in Norway subject to concessions: total fleet capacity and the number of vessels in different size classes (hectoliters cargo capacity)**



Source: Statistics Norway: Fisheries Statistics and Directorate of Fisheries.

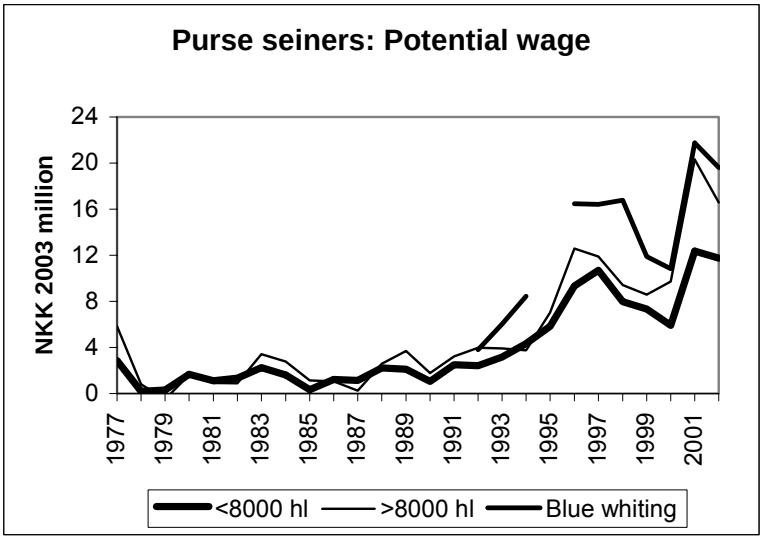
What were the results in terms of profitability? **Figure 17** shows the potential wage of three groups of purse seiners. Since the early 1990s this has greatly improved. Before we jump to ascribe this to the buy-back program let us note that most of the money was spent during the very first years (1979-83), although there was a spike again in 1987-91 (see **Table 2)**. However, it is not so far fetched to attribute success to the buy-back program. The value of the catches of pelagic species, the bulk of which is taken by the purse seiners, continued to fall until the late 1980s (see **Figure 18**). Hence, initially, the buyback program did not do much more than prevent falling catch values from translating into ever lower potential wage for the purse seine fleet; as we see from Figure 17 the potential wage remained fairly constant after the buyback program began and until the late 1980s. In the 1990s, and especially after 1995, the potential wage has risen handsomely. This has been due to an increase in catches, and even more so to an increase in fish prices, but these gains have not been eroded by the entry of new boats; the total capacity of the fleet has remained fairly steady despite a high and rising potential wage per boat. This is, of course, due to the closed entry implicit in the concession regime, but that regime has also provided for a positive and lasting effect of the buy-back program.

Table 2. Grants for scrapping or selling purse deiners

Period	NKKMillion	Number of boats
1979-83	225.2	67
1984-86	24.5	5
1987-91	193.8	29
1992-93	3.0	1
	446.5	102

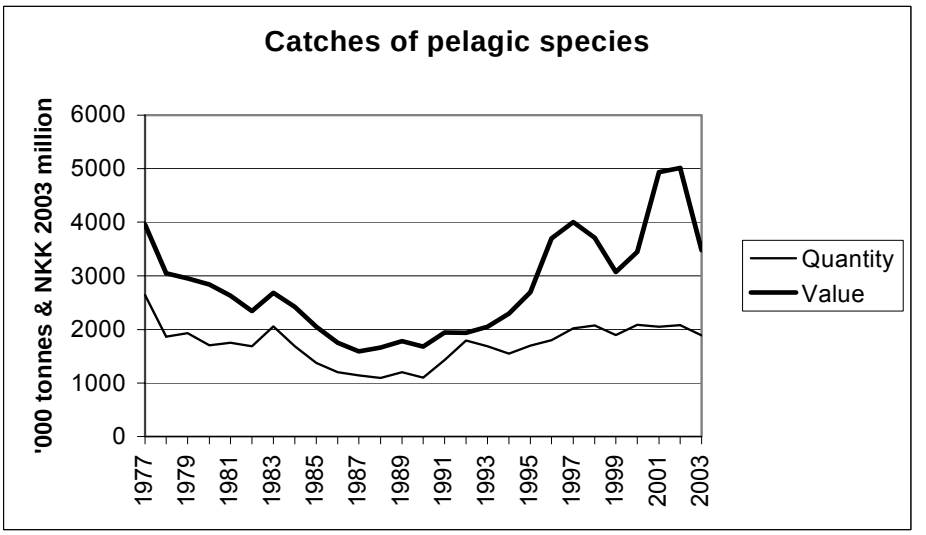
Source: Statens fiskarbank

Figure 17. **Potential wage per vessel of three groups of purse seiners**



Source: Directorate of Fisheries: Cost and earnings studies.

Figure 18. **Catches (value and weight) of pelagic species in Norway**

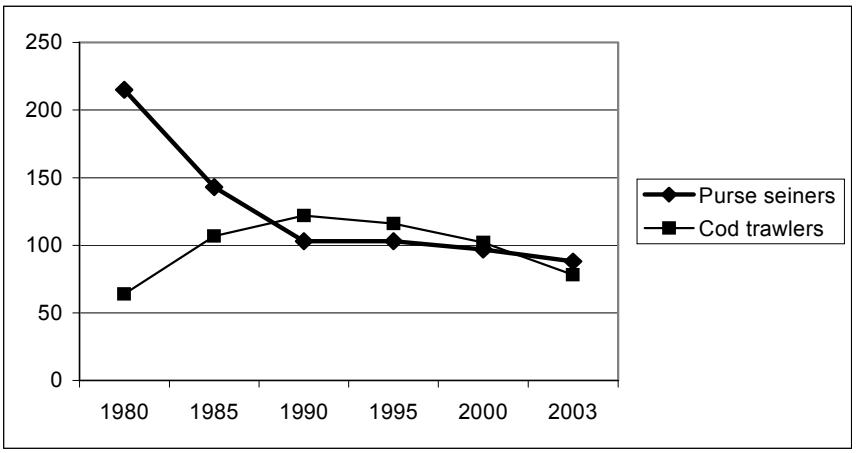


Source: Statistics Norway: Fisheries Statistics and Directorate of Fisheries.

For other segments of the fleet the buyback program was much less successful. One reason is that the money was spread more thinly, another and probably a more important one that entry into these fisheries was less tightly controlled until very recently. **Figure 19** shows how the number of licenses (concessions) for purse seining versus cod trawling has changed since 1980. While the number of purse seine licenses has fallen

from 215 to 88 the number of licenses for cod trawling almost doubled from 1980 to 1990. While the number of licenses for cod trawling has declined since then it is still higher than in 1980. Above we found that the potential wage of the large wet fish trawlers has increased only moderately in the 1990s, and not at all if we take the mid-1980s as a point of reference.

Figure 19. **Number of licenses (concessions) for purse seining and cod trawling in Norway**



Source: Directorate of Fisheries.

Conclusions

Several interesting conclusions emerge from the experience with the Norwegian fisheries subsidies.

First, subsidies that are meant to be temporary and to make a structural change less painful to achieve have a tendency to become permanent. The pain refuses to go away, reasons can be found to make the transition more gradual, interest organizations mobilize to make the subsidies permanent and discover new arguments to make them so. In Norway they were greatly helped by the discovery of the oil and gas wealth which gave rise to an assortment of ideas to build a great society. With the fall in oil prices in 1986 sobriety set in, and the fisheries subsidies were virtually abolished alongside a number of other economic reforms aiming at rooting out endemic inflation and put the public finances on a sounder footing.

Secondly, the abolition of subsidies does not necessarily mean gloom and doom for the industry. The Norwegian fisheries subsidies disappeared with remarkably little pain. The timing was not auspicious in all respects. The years around 1990 were difficult in the cod fisheries; the cod quota was cut to an unprecedented low, and some fishermen went broke. Yet the fisheries subsidies were much lower than they used to be and as times got better they were virtually abolished. The profitability of the fisheries is not lower than it used to be during the subsidy regime and in some fisheries certainly better. Conversely, contrary to being a cure for inadequate incomes and revenues in the industry, subsidization can set in motion a process which, over time, increases the "need" for

subsidies. Subsidies may encourage excessive investments, which depress incomes in the industry. There was some indication of a vicious circle like that in Norway during the heyday of subsidies in the 1970s and 1980s.

Third, timing is important. There are two aspects to consider. One, in order to implement political changes a perception of crisis is usually necessary. The drastic decline in oil prices in 1986 offered a golden opportunity and a clear need to reign in some excesses in public finances in Norway and in economic policy in general. Two, removal of subsidies causes much less pain in the industry if it is done on an upturn in the fishery cycle. The years after 1990 brought considerable increase in catch and fish prices and offered a good opportunity to remove the subsidies without causing too much pain.

Fourth, the removal of subsidies sets in train structural changes that enable the industry to survive on its own. Ineffective firms disappear, improving the balance between the available resources and the fishing fleet. Policy makers find greater resonance in the industry for reforms that increase efficiency, and the industry may take some such initiatives on its own. From the mid-1990s and up to the present, individual transferable quotas have come to be increasingly applied in the Norwegian fisheries, albeit with some hesitation and restrictions on transferability. The industry itself has played an active role in dividing the total catch quotas for individual fish stocks between different segments of the fishing fleet, on which basis the individual vessel quotas have been designed.

Fifth, not all subsidies are necessarily bad. Much depends on the context and the management regime applied. The buy-back program helped putting the purse seine fishery on a sounder footing. It worked because the fishery was closed and there was a measure of transferability of fishing rights in the form of tradable fish concessions. Needless to say, such help to restructuring must be temporary. To the extent it is foreseen it will be expensive, because it inflates the market value of old boats. The industry may very well be able to restructure without any such help, so its harm may be mainly be in the form of expenses for the taxpayer or the crowding out of other and more worthy public expenditure.

Chapter 6. Subsidies and the 2003 Cod Fishery Closure in Canada

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Introduction

This case study forms part of Canada's contribution to the OECD Committee for Fisheries project analyzing the effects of government financial transfers (GFTs) on the fishing industry. This paper examines Licence Retirement Programs (LRPs) as a specific type of GFT. LRPs and vessel decommissioning schemes have been employed in many countries over the past thirty years. A cursory search of the literature reveals at least 35 distinct LRPs in 10 countries. A LRP is often introduced in response to a dramatic Total Allowable Catch (TAC) reduction or a fishery closure. Simply put, the licence is removed by the management authority in exchange for a financial payment. In other instances, the LRP has purchased a licence, and transferred the right to catch or the privilege of access to other fleets or groups in society.

This paper is a case study of why Canada's response to the 2003 closure of 3 Atlantic cod stocks did not include a LRP, whereas the response to closures of the same stocks in 1992/93 resulted in a series of LRPs. It explores why a similar problem (closure of the same stocks in the same areas, ten years later) resulted in very different policy responses.

Cod management

Until 1992, groundfish, especially cod, was the foundation of the Atlantic fishery in Canada. In some areas, it was the foundation of the entire economy. In the province of Newfoundland and Labrador, one person in five was employed in the fishery.

In 1968, over 800 000 tonnes of cod was harvested from the most abundant of stocks, the northern cod stock, in Northwest Atlantic Fisheries Organization (NAFO) area 2J3KL. By 1987, Atlantic Canada landed 886 000 tonnes of groundfish, over half of which was cod (**Figure 1**). While the importance of groundfish to the fishing industry varied considerably by area, in the province of Newfoundland and Labrador, groundfish supplied approximately 80% of fishing revenue. In some communities, this reliance was effectively 100%. Due to the enormous volume of groundfish, its particular dominance in the employment-intensive inshore fishery, and despite the greater value (by weight) of shellfish, groundfish employed two thirds of those in the fishing industry. In 1990, more than 800 fish plants employed 60,000 workers; 26 000 families depended on processing to earn a living. Dependence on cod extended through plant workers, licence holders and crew members.

Figure 1. **Canadian fisheries landings**

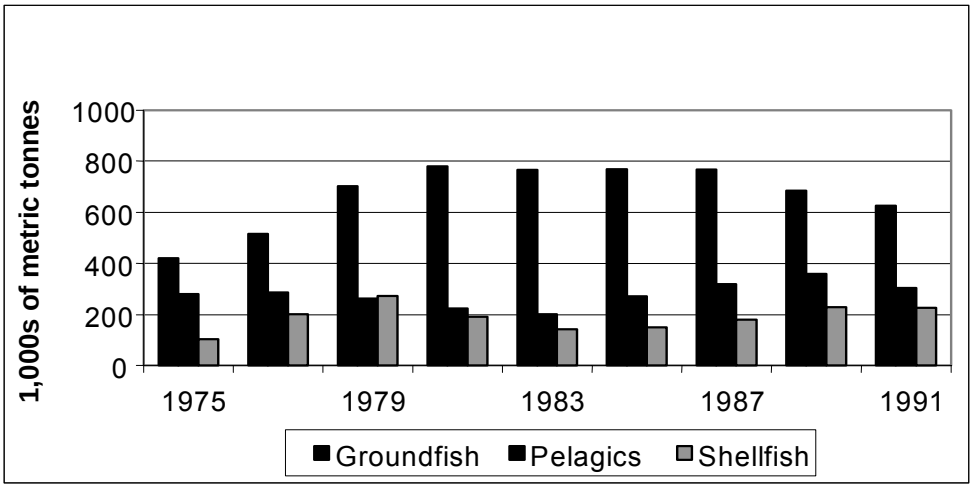
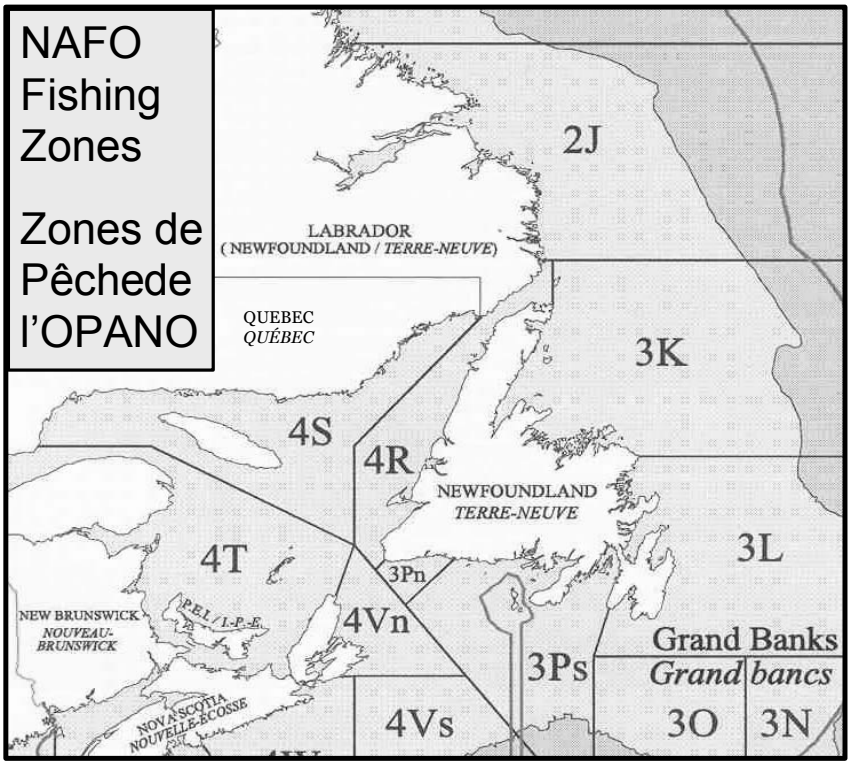


Figure 2. **NAFO fishing zones**



In July 1992, the Canadian government responded to a sharp decline in Northern cod stocks off of Newfoundland (NAFO area 2J3KL) by imposing a two-year fishing moratorium. This stock alone had accounted for one half of all cod landings in Atlantic

Canada, and had supported 12 000 fishermen and 15,000 plant workers in the province of Newfoundland.

In November 1993, a federal task force noted that "recovery will take a long time – most of these stocks, especially northern cod, will require at least five to seven years; and, after recovery, catches generally will be substantially lower". It had become clear that the outlook for northern cod had worsened since the moratorium and in December 1993, and the government announced that the ban on cod fishing would be extended indefinitely. By 1994, the cod moratorium was extended to include cod stocks off the south coast of Newfoundland (3Ps), in the Gulf of St. Lawrence (3Pn4RS and 4TVn) and off part of Nova Scotia (4VsW) (**Figure 2**).

The Gulf and Northern cod stocks were re-opened by 1997 and 1998, respectively, at a level of less than 5% of the 1991 pre-moratorium TAC. The stocks were thought at the time to be recovering from the lows of the early 1990s. The stocks were fished at a low harvest level until 2003.

Canadian Response 1992-2002

The closure has been called the biggest lay-off in Canadian history, affecting the entire east coast of Canada. According to studies, "In ecological and societal terms, those dependent on the fishery, particularly the groundfish fishery, face the equivalent of the prairie dust bowl of the 1930s or the Irish potato famine of the 1840s" And in Newfoundland, the "impact on the people, communities and economy … will be devastating".

A comprehensive response was required to address the social devastation, to diversify the regional economy such that it would become less dependent on a single sector, and to make changes within the fishing industry itself to promote self-reliance, self-adjustment and increase economic and employment stability.

The Canadian position was that "governments have a responsibility towards affected individuals to help them adjust to the calamity of losing their livelihood. Governments have a responsibility towards fishery-dependent communities to help them adjust". Accordingly, the response provided:

- income assistance for fishers and plant workers to offset the immediate social consequences of a closure ("social adjustment"), and to improve their long-term economic prospects and therefore to realize labour market adjustment ("economic adjustment"); and
- a restructuring of the industry by reducing participants and capacity, and in so doing, promoting an ecological and commercially sustainable future fishery.

As **Figure 3** illustrates, through LRP and changes in policy, the 1990s were marked by a steady decline in the number of groundfish licences (a drop of nearly 40% in 10 years). There were three components to the fisheries adjustment measures designed to reduce capacity and restructure the industry:

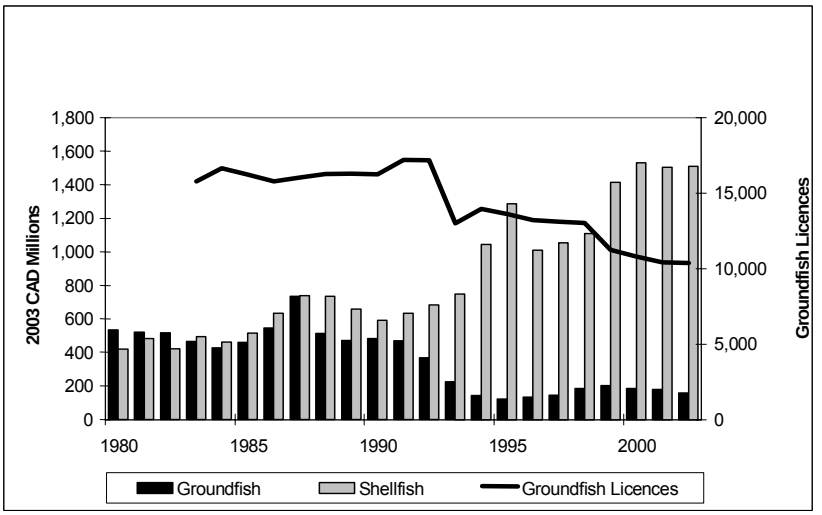
- Cancellation of inactive groundfish licences.
- The establishment of "core" fisher status, to promote the emergence of a core group of professional fishers, able to diversify their operations to take advantage of a greater variety of fisheries, including the more lucrative shellfish stocks. This

ensured that the substantial increases in shrimp and crab quota were directed to core licence holders with a significant attachment to the industry. Non-core licences were made non-transferable, and will expire when the licence holder no longer participates in the fishery. This, in effect, ensures a future further capacity reduction.

- Licence retirement programs (LRPs), targeted to licence holders with a significant attachment to the fishery.

Figure 3. **Landed value and number of groundfish licences**

Atlantic Groundfish and Shellfish



In response to the crisis, the Government of Canada developed three separate programs that included a LRP component for the Atlantic fishing industry between 1992-2002. In total, CAD 3.5 billion was spent on income support, industry adjustment measures and economic development assistance programs. From the point of view strictly of licence retirement, a total of 3,686 licences were retired at a cost of CAD 330 million. Participants in each program were required to permanently exit the fishery.

As noted above, the establishment of core fishers and the cancellation of inactive licences further reduced participation. In Newfoundland and Labrador, the 9 500 groundfish licences in existence in 1992 had been reduced by 50%, to 4 700, by 2002. This number will be further reduced by 735 as non-core licences expire.

Table 1: Assistance programmes for the Atlantic fishery with a licence retirement component 1992-2001 (CAD million)

Program Components/Year	NCARP 1992-1994	TAGS 1994-1998	CFAR 1998-2001	Total
Income Replacement	484	1 750[2]	315	2 549
Training & Counseling	333		0	333
Vessel Support Program	15	12	0	27
Early Retirement	31	28	85	145
Licence Retirement	**40**	**60**	**230**	**330**
Economic Development	0	50	100	150
Total	903	1,900	730	3,533

[1] Adapted from DFO media backgrounder "Current State of the Atlantic Fishery April 2003" available at:

http:www.dfo-mpo.gc.ca/media/backgrou/2003/cod-1e.htm

[2] Includes money for training & counselling

NCARP – Northern Cod Adjustment and Recovery Program

TAGS – The Atlantic Groundfish Strategy

CFAR – Canadian Fisheries Adjustment and Restructuring Plan

Objectives of licence retirement programs

The desired outcomes of past Canadian programs were social adjustment, economic adjustment, and industry restructuring. The means to achieve these outcomes were the program objectives. The objectives of a LRP, as one element of a more comprehensive response program designed to realise the desired outcomes, can be generalised into three categories:

- a transfer payment or "compensation" for the licence holder and their transition into other economic sectors (social and economic adjustment);
- improved conservation of the resource (industry restructuring); and
- improved economic efficiency (industry restructuring).

These objectives are to a certain extent mutually reinforcing: greater economic efficiency (resulting from fewer participants) may lead to improved conservation of the resource. In other ways, the objectives may contradict: transfer payments may reduce industry restructuring if the income assistance payments maintains marginal participants in a fishery, and in so doing lowers the economic efficiency of the fishery.

The objectives of a LRP applied to a closed fishery are by definition different from a LRP applied to a fishery in which the TAC has been severely reduced for conservation reasons, or to reduce participation to improve economic efficiency (as in the LRP applied to the British Columbia salmon fishery in 1970, 1981, and 1993; and the Atlantic lobster fishery in 1969 and 1977). For a closed fishery, the objectives (aside from a transfer payment objective) are to improve the future prospects for conservation of the resource and the economic efficiency of the future fleet that would operate when the fishery reopens.

For this reason, the nature of the closure is critical: a short-term moratorium with an anticipated re-opening at a certain TAC suggests a LRP with the objectives of reducing licences within the given timeframe to a target participation at a level appropriate for the TAC when the fishery re-opens. A LRP for a short closure therefore could have strong industry restructuring objectives. By contrast, the objectives of a LRP for a fishery with an expected long-term closure (in which TAC is expected to remain at zero for many years, or indefinitely) are tenuously linked to industry restructuring: neither resource conservation nor economic efficiency is an issue within the planning time frame.

Objectives of past licence retirement programs

In order to evaluate past LRP applied to northern and gulf cod, it is necessary to examine their specific objectives. The Northern Cod Adjustment and Recovery Program (NCARP) had two basic objectives:

- to replace the income lost by those affected by the moratorium; and
- to restructure the fishery so that it would be better able to sustain itself once the moratorium had ended.

The LRP portion of NCARP had no target number for capacity reduction (e.g., number of licences). Payment was based on a multiple of landed value, ensuring a link between cost and capacity. However, to qualify for licence retirement, a fisher must have been eligible for the income replacement component of NCARP. As criteria for accessing income replacement was based on dependence on the fishery, the LRP was *de facto* targeted to dependence rather than capacity.

The overall objectives of The Atlantic Groundfish Strategy (TAGS) were to:

- restructure the fishery industry in Atlantic Canada to become one that is economically viable and environmentally sustainable through resource rebuilding and the reduction of the harvesting and processing capacity;
- facilitate the labour market adjustment of individuals affected by the Atlantic fishery crisis;
- enhance the profession of fishers who remain active in the fishing industry; and
- facilitate community economic adjustment focused on regional strengths and opportunities of those areas affected by adjustments in the fishery industry.

The LRP component of TAGS aimed to remove 50% of existing groundfish licences. Eligibility was limited to fishers who had a demonstrated dependence on groundfish and a significant attachment to the fishery. Among those eligible, the objective was to retire the maximum harvesting capacity at the lowest cost per unit of capacity removed.

The Canadian Fisheries Adjustment and Restructuring was announced as "the last opportunity for fishers to leave the fishery with government assistance". A central goal of the CFAR licence retirement program was to achieve a better balance between the resources available and the number of people who depend on them for their livelihood. Specific objectives were to:

- permanently remove up to 3 000 groundfish licences from the Atlantic fishery, with the primary focus on licence holders who were eligible under TAGS;

- achieve a more diversified and economically viable fishery by retiring licence holders who were less viable and less diversified relative to others within a specific area; and
- retire those licences for which the bid amounts provided the best value.

The licence retirement program of CFAR was available to all groundfish licence holders in Atlantic Canada and Quebec with vessels less than 65 feet length overall. A variety of criteria were used to retire licences, including historical degree of dependence and attachment to the fishery.

Evaluation of past license retirement programs

Past LRPs removed over 3 600 licences; no vessels or gear were purchased. Policy changes removed additional low-value or inactive licences. The question is whether the outcomes of social adjustment, economic adjustment and industry restructuring were realized.

On the matter of social and economic adjustment, the LRP component of past programs did transfer CAD 330 million to licence holders interested in permanently exiting the fishery. As such, money was provided to individuals who gave up licences, providing recipients with the means to finance self adjustment. That said, social adjustment was not the primary focus of past LRP; instead these should be seen as an inducement to licence-holders to avail themselves of those components of the response better able to provide economic adjustment (e.g. retraining, economic diversification, etc.). Furthermore, LRP do not provide any assistance to the majority of those attached to the fishery: crew, processing plant workers, suppliers to the fishing industry, or other economic sectors that indirectly benefit from the fishing industry.

On the matter of industry restructuring, progress would be realized towards the objective if sufficient catching capacity were removed so as to improve resource conservation or the economic efficiency (profitability) of the fleet that remained. However, resource conservation was not a primary objective of past LRPs. Only TAGS mentions it in passing, and hence the impact on LRPs on resource conservation is not assessed in this case study.

As a general comment, if TAC is set independently of the composition or size of the fleet, and such a TAC is effectively enforced, then the outcome of industry restructuring is irrelevant to resource conservation. In reality, overcapacity may in fact lead to harvesting beyond the established TAC, discarding, or pressure to set the TAC higher than what would be biologically warranted. Overcapacity may lead to fishing enterprises competing for stocks insufficient to support all enterprises. This competition may lead to increased effort (leading to increased bycatch or habitat degradation), misreporting of catches, disincentive to invest in conservation measures to maintain the stock, or pressure on the fishery manager to increase the TAC beyond that which would be a biologically precautionary level.

The International Plan of Action for the Management of Fishing Capacity does state that "excessive fishing capacity is a problem that, among others, contributes substantially to overfishing, the degradation of marine fisheries resources, the decline of food production potential, and significant economic waste". Thus the link of overcapacity to resource conservation is made. Where such conditions do not exist, the link between LRP and resource conservation is weakened.

The Auditor General of Canada noted in 2000 that "The removal of these groundfish licences is important to the management of the groundfish fishery. However, the Department is still developing the means to measure and, if needed, manage surplus harvesting capacity. Therefore, the Department does not know the impact of these measures on harvesting capacity." It was not, therefore, possible to know if the level of participation was appropriate, as the tools to understand what capacity the participation represented did not exist.

Moreover, the cod stocks did not recover as anticipated during the first moratorium, and the TAC was consequently set lower on re-opening than earlier hoped. The situation under which the programs had been established had shifted considerably. Therefore, even if licence reduction targets had been reached, the fleet would still have been too large for the catch available. It is a near-impossible task to establish the ideal capacity level (even were one able to measure it) for a stock that will re-open at an unknown time, and at an unknown level.

During 2002, the last year of the fishery, nearly 3 900 licence holders participated in the harvest of a 15 000 tonne cod fishery of a few weeks duration. From an economic perspective, it is clear that the fishing capacity that remained when the fishery reopened in 1997/98 (and continuing through to the 2002 fishing season) exceeded that required to harvest the available catch.

In the absence of nation-wide cost and earning data, it is difficult to assess the economic viability of the participants involved in this fishery. That said, the viability of many harvesting enterprises can be assumed to have improved in recent years as the number of participants has been reduced and the landed value of the fishery has significantly increased. An assessment of gross earnings reveals that almost 50% of those licence-holders catching cod depended on those stocks for less than 10% of their fishing earnings. Therefore, this group was primarily engaged in other fisheries, and cod represented a relatively minor portion of their enterprise. For those licence holders for whom cod was an important component of their landed value (more than half of landed value from cod), 80% had landings less than CAD 20 000. Hence, those most dependent were also those who earned the least from fishing.

The economic position of the fleet would have been considerably strengthened had the stocks rebounded to the levels as hoped; as it was, with a low TAC, previous LRP failed to reduce the fleet to a level commensurate with the available resource.

Policy drawbacks to licence retirement programs

The policy drawbacks to LRP are well documented elsewhere, and for the purpose of this case study, they require only cursory mention:

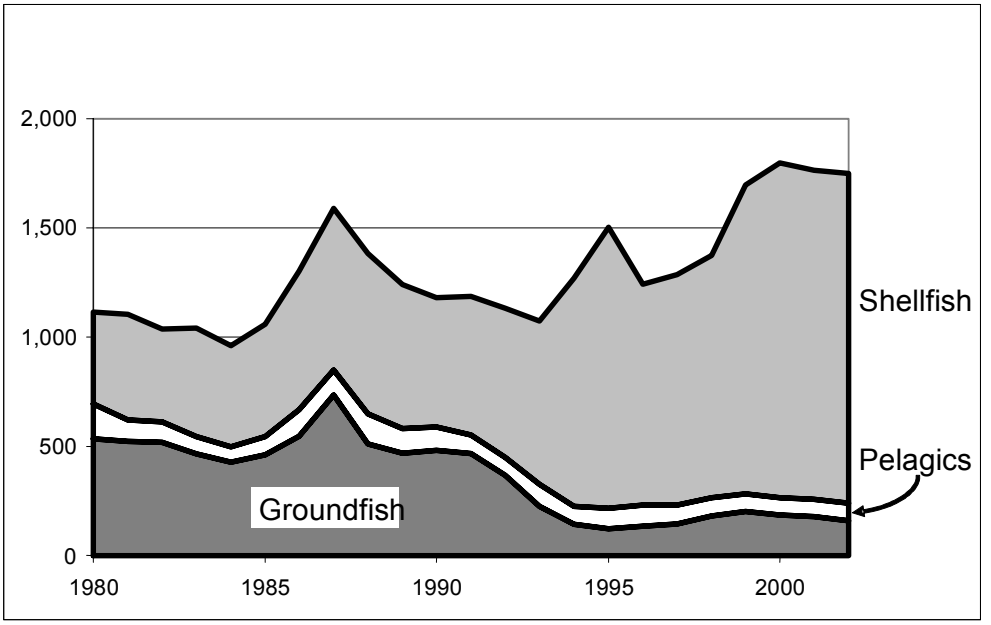
- Input stuffing: unless entry and effort controls are in place, removal of capacity through a LRP may be met with capacity increases for the remaining fleet, reducing the program's effectiveness. As a related issue, the removed vessels could transfer capacity to other fisheries, leading to overcapacity or resource pressure.
- Expectations for future assistance: although assistance may have the very best intentions, the response to a fishery decline creates the expectation of assistance in any decline, perpetuating the dependency of certain parts of the fishing industry on government transfers. As noted above, CFAR was announced as the

last opportunity for fishers to leave the industry with government assistance. As Figure 4 illustrates, a costly government response for a small portion of the groundfish fishery would establish a prohibitively expensive precedent in the case of a downturn in a shellfish species.

- Perverted incentives: related to the point about expectations, above, government support of LRP can reduce the incentive fishers have to conserve or self-adjust to regular increases and decreases in TAC to maintain economic efficiency and resource sustainability.
- Expensive: LRP are invariably expensive. In the case of a closed fishery, government is purchasing an asset with no earning value. Furthermore, if the value of a licence includes not only the value of the catch, but access to other government programs (such as employment insurance, or favourable tax treatment), then the payment for the licence would include the present value of all future associated benefits. This can drive the price of a licence to a figure many times the value of fish caught. Finally, vessels and gear were not purchased; as past LRPs required a permanent exit from the industry, this certainly had a significant impact on the cost of retiring a licence.

Figure 4. **Landed value of the Atlantic fishery**

(2003 CAD million)



These issues, along with an evaluation of the LRPs in the 1990s, are relevant in the examination of the policy direction taken following the 2003 cod closure.

2003 cod closure

In early 2003, scientists and fisheries managers from Fisheries and Oceans Canada, participants from the Atlantic fishing industry and academics from Canada, the United

States, the United Kingdom and Iceland met to assess the state of the northern (2J3KL) and Gulf of St. Lawrence (3Pn4Rs and 4TVn) cod stocks. In general, they concluded that the stocks were in very poor shape and imminent recovery was unlikely.

The group concluded that the southern Gulf spawning stock biomass would decline and that rebuilding was unlikely over the next few years, even in the absence of fishing. In the northern Gulf, the stock's abundance and stock spawning biomass remained low, and had declined since 2000. The stock could be expected to increase only marginally, even in the absence of fishing. Last, the Northern cod biomass was determined to be extremely low, and that projections indicated that during the next decade the stock spawning biomass in the inshore area will not reach the level achieved in 1998, even in the absence of fishing.

In response to the scientific assessment, the Minister re-introduced a closure. The government concluded "that there will not be a prompt recovery in any of these stocks in the near future". Of the Total Allowable Catch (TAC) of 18 262 tonnes set in 2002 (the last year prior to the closure) for these three stocks, fishers harvested approximately 15,000 tonnes, including bycatch. These cod stocks were worth about CAD 20.5 million in landed value, or just over 1% of the CAD 1.8 billion Atlantic fishery.

Despite the removal of 3,686 licences through the three retirement programs 1992-2002, there remained 6 380 groundfish licence holders entitled to fish for cod from these three cod stocks in 2000. Of this number, 3 882 actually fished for cod – mostly in small quantities.

Predictions and planning were for a lengthy closure. However, possible evidence of improvements in the stock in the 2003 survey, and the need to foster shared stewardship with the industry, led the Minister of Fisheries and Oceans to reopen the two Gulf of St. Lawrence stocks in May 2004, at half the harvesting levels of 2002. The Northern Cod (2J3KL) stock remains under moratorium. At such low catch levels, the landed value of the Gulf cod would be insignificant against the value of other species. The 2004 limited reopening notwithstanding, the planning assumption for the 2003 announcement was for a long-term closure.

Response to the 2003 closure

The areas that were most affected by the closure of the cod fishery tended to have lower average incomes, fewer economic opportunities, an existing high unemployment rate, and lower education level. At the time of the closure, the Canadian federal government was exercising strong fiscal controls to maintain the country's strong economic position, and sought to reduce discretionary spending in non-priority areas. That said, it has been the consistent government position to ensure that no area of the country is neglected, and that regional economies are provided with economic diversification assistance.

Accordingly, the Government introduced a two year response program at the April 2003 closure announcement:

- a CAD 44 million community-based economic development assistance program to provide assistance for short-term job creation; and
- a CAD 6 million program to expand on current activities to evaluate and assess the impact of seals on fish stocks.

Six weeks later, the Canadian government added a CAD 27 million Temporary Fisheries Income program to provide temporary financial assistance to fishers and plant workers whose employment insurance benefits expired before the community-based economic development measures could be implemented. No LRP was made available.

For a variety of reasons, while past LRPs (coupled with various management changes) did remove a considerable number of licences, they did not result in the removal of a significant amount of harvesting capacity. A significant constraint for the TAGS program was that the budget for the LRP component was dramatically reduced to fund the income replacement element . Past LRPs attempted to reduce capacity to a level appropriate for the TAC level anticipated upon reopening. Cod stock rebuilding occurred at a level lower than expected, and thus overcapacity would have remained even if the LRPs had removed the intended level of capacity Atlantic-wide.

In contrast to the previous announcements, the 2003 announcement was for a long-term closure (although no fixed re-opening date or criteria were set). Since no fishing on these stocks was expected for a long time, the LRP objectives of increasing economic efficiency or improved resource conservation were not applicable. The sole justification for a LRP in the context of a long closure would be a transfer payment to licence holders in order to realize social adjustment. As has been illustrated above, LRP are not particularly well suited to this objective. Instead, transition income assistance was provided to individuals affected by the closure to reduce the social cost, and economic development funding was provided to create non-fishing employment opportunities for displaced fishers and plant workers.

Last, Fisheries and Oceans Canada was in the final stages of revising its Atlantic fisheries policy. Out of this consultative process came a new framework to promote conservation and sustainable use of fisheries resources, self-reliant fisheries, a stable and predictable access and allocation approach and shared stewardship with resource users. A government-funded LRP does not support these objectives.

Conclusions

A LRP can help to restructure an industry, by removing participants, in the hope of increasing the economic viability of those who remain, and reducing the pressure on the resource. Policy changes, however, are just as important. These changes must promote an industry composed of professional fishers, and (where possible) with access to a variety of species so that they can better weather the ups and downs of the resource. Removing a licence does not necessarily remove capacity. If inactive (or barely active) licences are removed, then the problem itself is not addressed.

A LRP does little to transform economies. Income support can help individuals through their immediate crisis, and while theoretically it can help fund their move to another industry, income support more often inhibits individual adjustment.

Removing licences does nothing if the underlying reasons for the overcapacity remain. If there are no other options to earn a living aside from the fishery, then the fundamental problem is the lack of widespread economic diversification and/or an inability for individuals to be able to make the transition (through lack of education, income, etc.). Economic diversification assistance for communities and transition assistance for individuals helps ensure that alternative employment opportunities are available for displaced fishery workers.

A LRP was not the appropriate policy response to the 2003 closure of the 3 cod stocks. Economic diversification assistance and a transition income grant were better able to realize economic and social adjustment. Industry restructuring would not likely be enabled by a LRP for a fishery in which the majority of participants depended on other species, and for whom cod would likely not be of significant importance for many years.

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Part III

Case Studies of Subsidy Reform Experiences in Industry and Transport

SUBSIDY REFORM AND SUSTAINABLE DEVELOPMENT: ECONOMIC, ENVIRONMENTAL AND SOCIAL ASPECTS – ISBN-92-64-02564-2 © OECD 2006

Chapter 7. Reform of Industrial Zone Subsidies in the Czech Republic

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Introduction

In the Czech Republic, a project analysing subsidies with adverse impacts on the environment and subsidies which are not in concordance with the principles of sustainable development was conducted by the Ministry of Environment in 2001 and 2002. A stocktaking of all public subsidies provided in the Czech Republic, their description, and their simplified evaluation in respect to their impact on the environment was carried out. Here we present basic information about the analysis of subsidies for industrial zones. This information has been elaborated on the basis of a case study on the industrial area of Kolin – Ovcarny and other data, especially those provided by both the CzechInvest Agency and the Czech Supreme Audit Office. The analysis was elaborated by CENIA, Czech Environmental Information Agency (CENIA) in co-operation with PORSENNA o.p.s.

Subsidies for industrial zones

The subsidy for the development of industrial zones was provided by the Ministry of Industry and Trade in the form of grants or returnable financial support in the framework of the programme for the development and technical renewal of engineering networks in industrial zones. Municipalities were recipients of the subsidies in most cases. The administration of the Programme was carried out by CzechInvest Agency.

The rules for providing and receiving the subsidy for the support of industrial zones' development was established in the "programme of support for development of industrial zones", which contained the four following programmes:

- preparation of industrial zones
- reclaiming of industrial zones
- development and reconstruction of rental properties
- accreditation of industrial areas

From 1998 until 2004, an overall subsidy of 4.5 billion CZK (150 mil. EUR) was assigned to 85 industrial zones in the framework of the programme. Originally CzechInvest focused on newly developed industrial zones (greenfields) only. Since 2002, it has also focused on reclaiming existing non-used pieces of land (brownfields) and also on supporting the infrastructure of already existing successful industrial zones.

More than 200 foreign and domestic companies developed their production plants on areas of newly built industrial zones with the support of state subsidies. These firms promised to create approximately 60 thousand new jobs and to invest more than 130 billion CZK (4.4 billion EUR). Approximately 30 thousands new jobs have been created. **Table 1** provides more details.

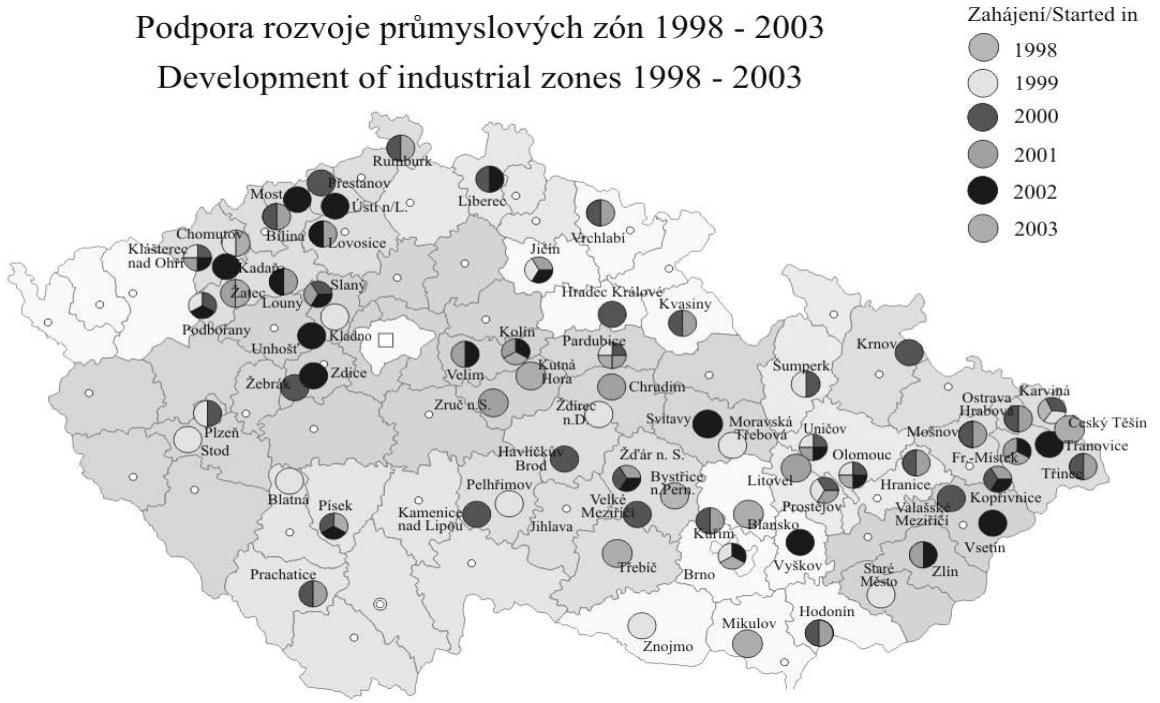
Table 1. Basic data regarding industrial zones created in the Czech Republic (1998 – 2004)

Type of the industrial zone	Number	Subsidies in mil. CZK	Area in ha	Notified new jobs	Investment of developers in mil. CZK
Greenfields	81	3 600	1 600	60 000	130 000
Brownfields	3	910	600	n.a.	n.a.
Development of existing ind.zones	1	20	198	n.a.	n.a.
Total	85	4 530	2 398	60 000	130 000

Source: CzechInvest

Chart 1 describes the history of the programme in the Czech Republic since the beginning of the project.

Chart 1. **Development of industrial zones in the Czech Republic**



Source: CzechInvest

Evaluation of subsidies from the environmental point of view

The development of industrial zones always leads to some negative impact on the environment. The evaluation of the whole impact of the programme was difficult due to the fact there was not enough data available and no unified methodology of evaluation had been previously used. Throughout the evaluation we therefore focused on possible future risks for the environment resulting from the programme.

The most problematic issues relating to this subsidy are the following:

- During the allocation phase of the subsidy the impact of the realisation of the project on the environment is not sufficiently taken into account. One of the most significant points of the Programme is the criteria for the allocation of the given subsidy, which differs for every subprogramme. Criteria for evaluating the impact on the environment, however, are not considered in every subprogramme.
- In the document,, "Strategy of the CzechInvest Agency for 2004-2006" another four priority areas are listed, namely the following: i) development of the entrepreneurial environment, ii) support of the foundation of new and the development of existing enterprises, iii) international co-operation, and iv) development of clusters. Within those categories environmental protection is not mentioned.
- There are no obligations for environmental protection measures once the industrial zones are operating. Environmental concerns are therefore not considered with regard to the operation of the industrial zone, nor for the construction of further infrastructure as for example additional roads or other traffic infrastructure, the emerging of further logistical centres, noise pollution, resulting emissions, odour etc.
- Environmental Impact Assessments (EIA) according to Act No. 100/2001 Coll. concentrate on the development (planning) of industrial zones and any possible problems resulting from its operation. Still, negative impacts from the operation of further infrastructure etc. do arise, because the planning of the latter often happen on an ad hoc basis and after the actual investment had been approved. The background materials for the EIA are therefore often very general and consider the financial means already invested.
- The subprogrammes do not prioritise or encourage the use of brownfields over greenfields.
- The "Strategy of the CzechInvest Agency for 2004-2006" contains specific targets: 330 ha of recultivated area (brownfield) and 800 ha of area for new investment (greenfield) until the end of year 2006. No significant shift towards the use of brownfields can be seen.
- The opportunity costs of the given area are not taken into account: Investment in the industrial site is a non-reversible process, which means the site will not be available for any other use in the following years.
- The main goal of the programme is the support of business activity and the creation of jobs. There is, however, no methodology to evaluate the actual number of newly created jobs.

- The efficiency of the industrial zones is evaluated very generally, for all projects together. It can therefore happen that cost-inefficient projects remain unobserved. An established indicator (e.g. investment per job created) does not lay open possible inefficiences of one individual project.
- From available data it is not clear, whether the lifetime of the industrial zone or the operational phase of the industrial zone had been taken into account. This means that an investor, who had been attracted to a site and guaranteed tax breaks for a certain period of time, leaves the site as soon as the tax break finishes. In the Czech Republic, an income tax exemption is guaranteed to investors for a period of 10 years. When evaluating the subsidy this negative impact on the state budget is not taken into account.

Recommendations resulting from the analysis

The analysis had been conducted with the aim of elaborating specific recommendations for the state administration, particularly the Ministry of the Environment, the Ministry of Industry and Trade and CzechInvest, as the institution with the competence to influence this public subsidy towards higher efficiency and a lower negative impact on the environment.

Recommendations for the Ministry of the Environment

- Maintain the right to evaluate project outlines of projects, whose evaluation is carried out by the regional government. The Ministry of the Environment has according to Act No. 100/2001 Coll. in justified cases the right to assess the environmental impact of a project. In the case of a development on a greenfield site it would be appropriate if the Ministry of the Environment made use of this right as the regional government often has to defend the rights to a clean environment for its citizens on the one hand and enable the investor the least complicated development of the project (which would be made difficult by harsh environmental regulations).
- Open a dialogue with the Ministry of Industry and Trade (guarantor of the programme) on adding further environmental prerequirements necessary for the registration of a project.
- Suggest and entrust specialised subjects that will, in co-operation with the local government, control the priorities of sustainable development defined for that given area.

Recommendations for the Ministry of Trade and Industry

- Develop a system of investment incentives which would lead to support of investments on brownfields and discourage investments on greenfield areas. For example, if a subsidy for the opening of a new industrial site is linked to income tax exemptions for a period of 10-15 years, this subsidy should be allocated only to investments on brownfields.
- Conduct an evaluation of all so far supported industrial zones (through an ex post analysis), which would analyse the real impact of the realisation and the operation

of the project – especially its true impact on the environment, the increased burden resulting from traffic, the noise level, the impact on the lowering of unemployment and the real income rise of the population in the given region, the development of secondary employment (tertiary sector) etc. The results could than be compared objectively with the prior established indicators (e.g. number of created jobs claimed by the investor).

- Introduce relevant environmental criteria into the attachments used for the evaluation of the registration of the given investment
- Establish a set of criteria for the registration of strategical industrial zones, which are not evaluated according to the criteria in the attachments C1-C5.

Recommendations for CzechInvest Agency

- Evaluate the given subsidy individually in the case of significant investors rather than a bundled evaluation for the whole set of projects. In this way, projects with costs significantly higher than the average costs would fall out.
- Conduct an analysis regarding the lifetime of projects, which should include the entire period during which the investor will carry out his activities (investment lifetime) and also for the period, during which the industrial zone will be in operation (economic lifetime). On the basis of this data the efficiency of the public funding should be evaluated.
- Update the "Strategy of the CzechInvest Agency for 2004-2006" with regard to the fact current industrial sites will become grey zones in the future. The recultivation of those grey zones should be taken into account during the strategic planning phase. The same would be appropriate to do for existing non-used grey zones – so-called brownfields.

Recommendations for local authorities

- Create a long-term strategy of spatial development in regard to good conditions for enterprises, housing, leisure, tourist industry and so on, in cooperation with consultants in the field of sustainable development and complying with regional development plans or their updates (regional strategic planes, strategies of economical development etc.). In contrast to documents elaborated in the standard way, a balance for economic development, social matters and environmental issues should be found.
- Require rigorous evaluation of possible alternatives for the use of the industrial zone from the investor or project documentation author. One possibility would be to carry out a detailed multicriterial analyses, in which an alternative usage of brownfields (which are usually available) will be evaluated with respect to a set of environmental, social and economic criteria. It is also important to judge the impacts on medium and small enterprises in the region, e.g. whether an inducted decrease of employment rate (though relative) might not occur as the consequence of the withdrawal of both qualified and non-qualified working force by the industrial zone.
- Take part in the EIA process in an active way and insist on the inclusion of the enterprise operation in the evaluation process. For example, the impact on the

local ecosystem should not be omitted. In the case of persisted doubt in the field of environmental impacts, some assessments in the field of ecology could be requested, e.g. more detailed evaluation of the impacts on the local flora and fauna, impact on hydrology etc.

- Promote, together with the other self-governmental bodies, that evaluations take into account the problems and weak features of long-term development of given municipalities in the context of all state subsidy programmes so that no state subsidy will create problems for the development of the given region.

Chapter 8. Restructuring Aid to the Steel Industry of New EU Member States

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Introduction

Steel is an important industrial sector in many of the new member States of the European Union. Altogether they produce 23 million tonnes of liquid steel: Poland produces about 9 million, the Czech Republic about 6 million, Slovakia 5 million, Hungary 2 million and Slovenia about 0.5 million tonnes. Moreover, the four candidate countries, *i.e.* Bulgaria (2 million), Romania (6 million), Croatia and Turkey have also a significant steel production. Altogether they have an annual output of almost 50 million tonnes (about 5% of the world production) and provide about 220,000 jobs.

The steel producing capacity in the new member States is today about 30 million tonnes. As the capacity has been above 50 million tonnes in the beginning of the 90ies it has already significantly decreased. Similar overcapacities occurred also in the old member States in the 80ies and 90ies, where an intensive restructuring has taken place. It was complemented by privatisation and consolidation of the former State owned companies. Thereafter, the ECSC Treaty, and after its expiry in June 2002, the EC Treaty have implemented sector specific rules prohibiting any kind of rescue and restructuring aid.

However, there is a common understanding that these rules cannot immediately be applied to acceding member States but that they should also have the opportunity to restructure and privatise their industry before being subject to the strict EC State aid rules.

Background - the need for steel restructuring in the new member States

After the fall of the iron curtain, many companies in the Central and Eastern European countries underwent a difficult transition from centrally planned to market economies. Despite the considerable progress made in restructuring their economies, the level of economic wealth remains, in general, much lower than in EU-15.

Entry into the common market required a sound economic consolidation in order to be able to compete on equal terms with EU companies. Therefore, the steel sector had to achieve significant modernisation, so as to enable the production of the grades and quality of steel required by the markets. To this end, a large number of non-viable facilities have been permanently closed and existing plants have been restructured.

Restructuring usually comprises a variety of measures, of which concentration and privatisation of the State owned companies is probably the most important. For example 80% of the Polish steel industry was merged into one company, which was then sold to a

private investor (Mittal Steel). The same investor also bought the biggest Czech steel producer Nova Hut. Furthermore, the biggest bulk of Hungary's steel industry was bought by a consortium led by Ukrainian company Donbass. The main Slovakian steel plant in Kosice has been bought by US Steel. These privatisations are based on privatisation agreements, which often contain a series of financial restructuring measures such as debt write-offs and tax exemptions. Although the governments have often committed themselves vis-à-vis the companies this does not mean that these agreements are not subject to State aid control.

In addition, changes in management structures and a reduction in manpower were unavoidable. A particular problem of steel is that steel restructuring generally has a major regional dimension, as most steel production is concentrated in certain industrial regions. For example in Eastern Europe some 40% of all steel production is concentrated in an industrial triangle on the Polish, Czech and Slovak borders. In order to tackle the problem of job losses, retirement and retraining schemes and the extension of income support to employees made redundant, were needed. They had to be complemented by encouraging SME start-ups and financing infrastructure projects. In Poland this was supported by EU finances through the Phare pre-accession strategy. This kind of support mainly went to the employees and not to the companies and was thus not considered State aid.

Moreover, in order for the steel companies to become viable industrial restructuring was necessary. New production processes had to be installed and outdated equipment needed to be replaced. In addition the production had to reduce input costs. Furthermore, considerable efforts were required to meet environmental standards applicable in the EU. In sum, such technical modernisation required investments for which State intervention was often necessary, in particular by providing fall back guarantees for the loans covering those investments.

Finally, the transition into a healthy and competitive, i.e. a viable steel industry, necessitated a financial restructuring. For example, existing debts had to be written off. In addition, those companies were often benefiting from tax exemptions and deferrals of public liabilities. Thus, the States had to waive large part of their existing debts and in some cases even to provide additional support for paying the debts of private companies. It is needless to say that any kind of industrial and financial restructuring with governmental support is likely to constitute State aid.

EC State aid rules for steel

Financial support of member States to their industry generally amounts to State aid, which is under the EU rules, Article 87, EC Treaty, prohibited. However, the *2004 Communication from the Commission on Community guidelines on State aid for rescuing and restructuring firms in difficulty* (hereinafter EC Restructuring guidelines) expresses that restructuring aid to firms in difficulty may if certain strict conditions are meet not be contrary to the Community interest.

On the other hand, the 1996 *Steel Aid Code of the European Coal and Steel Community* (ECSC) prohibited restructuring and investment aid completely. This was the result of lessons learned from the overcoming of the steel crisis which started in the early 80ies and continued until the mid 90ies. A reduction of overcapacity was only achieved after the Steel Aid Code made capacity reduction a precondition for State aid.

Since the expiry of the ECSC Treaty in 2002, the general EC State aid rules apply to the steel sector. However instead of the EC Restructuring guidelines, the EC issued a so called *Communication from the Commission on Rescue and Restructuring* aid and closure for the steel sector which stipulates that rescue and restructuring aid in the steel sector is not permitted. Only closure aid, as an exception from the prohibition to grant restructuring aid, is exceptionally allowed. Such closure aid may be aid to redundant employees that are laid off or aid to support companies to close their facilities. The latter is however only accepted if the entire legal entity is closed.

In addition, also regional investment aid is prohibited under point 27 of the *Multisectoral framework on regional aid for large investment projects*. In sum, essentially any kind of significant investment aid in the steel sector, be it for restructuring or other purposes, is prohibited. The Commission has made sure that its laws were not circumvented by abusing the defence that the investments were allowed in view of the market investor principle. Consequently, the Commission has in recent years only authorised a very limited amount of aid for objectives such as environmental protection or research and development (R & D).

Transitional rules for new member States

The possibility to restructure the steel industry in the new EU member States was initiated on the basis of several Europe Agreements around 1993. This was the case for Poland, the Czech Republic, Hungary, and Slovakia. For example, Article 8(4) of Protocol 2 of the Europe Agreement with Poland stipulated that, during the first five years after entry into force of the Agreement, Poland could exceptionally, as regards steel products, grant State aid for restructuring purposes, given three conditions.

These conditions are that:

- restructuring leads to the viability of the benefiting firms under normal market conditions at the end of the restructuring period;
- the amount and intensity of restructuring aid is strictly limited to what is absolutely necessary in order to restore viability and that the aid is progressively reduced; and
- restructuring is linked to a global rationalisation and reduction of overall production capacity.

In the event the restructuring could not be achieved in the five years grace period, which was the case of Poland and the Czech Republic, an extension of the grace period for granting State aid in the steel sector was negotiated. However, the EU indicated that it would consider the prolongation under condition that a national restructuring programme was set up, which was in 2003 accepted by a Council decision and then incorporated into the Treaty of Accession. In fact, the Treaty of Accession signed in Athens on 16 April 2003 by the Heads of State and Government of the enlarged EU incorporated Protocol No 2 on the restructuring of the Czech steel industry and Protocol No 8 on the restructuring of the Polish steel industry. (A similar Protocol to the Accession Treaty is envisaged for Romania). Moreover, point 4 (2) of Annex XIV of the Treaty of Accession allows the application of a fiscal aid scheme to the Slovakian steel sector.

These rules essentially provide for an exception of the rule that restructuring aid for the steel sector is prohibited and are also *lex specialis* to the normal transitional rules in

the Accession Treaty. Thus, Protocol 2 of the Europe Agreement and the Accession Treaty protocols provide the legal background for the steel restructuring. The national restructuring programmes are the common denominator of most transitional regimes and have generally been a precondition for the EU's approval exceptionally allowing the candidate States to derogate from the normal rules.

Key parameters of a national steel restructuring programme

There are no clear EC Guidelines for setting up a steel restructuring programme. However, Protocol 2 of the Europe Agreement indicates the main parameters of a restructuring programme, *i.e.* viability, the minimum amount of State aid necessary to achieve viability and the reduction of capacity. Moreover, the overall aim of the requirement to produce a national restructuring programme in a pre-accession context is clearly to obtain transparency in the steel sector.

In addition, some guidance can be drawn from the general EC Restructuring guidelines. While these guidelines are not directly applicable to the steel industry because the EC regime prohibits restructuring aid for the steel sector, these general rules should however at least be considered as a source of inspiration for the exceptional case where restructuring in the steel sector is nevertheless allowed. Although the rules in the EC Restructuring guidelines appear to limit the availability of aid far more than it can be observed during the recent steel restructuring, the guidelines mitigates against this presumption as they allows for less stringent rules in assisted areas especially regarding the implementation of compensatory measures and for the beneficiary's own contribution. The candidate countries and especially the steel regions could generally be viewed as assisted areas.

Viability

The first point of Article 8 (4) of Protocol 2 of the Europe Agreement and the EC Restructuring guidelines are based on the principle that the overall aim of any restructuring is to achieve long term viability of the companies concerned. The restructuring programme must therefore show that viability of the beneficiary companies under normal market conditions will be restored at the end of the restructuring period. In order to do so individual business plans of all beneficiaries of State aid must be presented.

Viability for the Commission essentially implies that the companies return to profitability at the end of the restructuring period. According to longstanding practice, which is also reproduced in Annex 3 of the Polish and Czech Steel restructuring protocol, the Commission considers that the companies should achieve a reasonable operating margin *(i.e.* an EBITDA over turnover of at least 10% for steel companies and 13.5% for integrated mills) and a minimum return on sales (*i.e.* the EBIT must be at least 1.5% of the sales).

While it remains that the above two criteria are the benchmarks of financial performance in the Commission's viability test, some special accounting conditions must also be observed, which have the purpose to safeguard against companies under-investing to boost short-term performance as a means of satisfying the viability criteria. These special accounting conditions include minimum levels of financial charges (3.5%) and depreciation (5% for steel companies and 7% for integrated mills), expressed as a percentage of steel sales revenue, and a price-cost squeeze. If the special accounting

criteria are not met in the companies actual forecast, the projections need to be adjusted by simulating that financial charges and depreciations are meeting the special accounting criteria.

The viability test should be performed on the basis of an individual business plan of a company which concentrates on the company's steel products related revenues and costs only. Therefore, the variable costs associated with non-steel products revenue must be ignored. The viability test should be applied to a sound set of financial projections for the restructuring period, *i.e.* profit and loss accounts, balance sheets and cash-flow statements. The financial projections should be prepared in current, not constant, prices taking into account inflation and exchange rate movements. This is necessary since costs are subject to widely differing inflation rates, some of which have no relationship with product prices.

Minimum amount of State aid necessary to restore viability

The main condition for establishing the amount of admissible State aid is emphasised in the second point of Article 8 (4) of Protocol 2 as well as in the EC Restructuring guidelines, *i.e.* that the intensity of aid should be strictly limited to the necessary amount to reach the objective of the restructuring programme (*i.e.* viability).

The "minimum necessary" is determined by two factors. It is the result of the total amount of funds needed to achieve viability minus the amount that the beneficiary himself is able to contribute. While in the EU a significant own contribution is necessary, this rule has in the past not been applied systematically in the accession countries. However, the more a company's eligibility for restructuring is questionable given that the company is on the verge towards viability, the more an owner contribution is indispensable.

In order to assess the "minimum necessary", the restructuring programme needs to provide information about the total amount of restructuring aid granted to the steel industry from the entry into force of the grace period until the end of the restructuring period. The information should be given at a company level and per year.

Apart from restructuring aid, also all other aid should be identified for each company. If these aids are compatible under the other rules applicable in the EC they will not be considered as restructuring aid and need not to be compensated. However, it is doubtful whether other aid, with the exception of closure aid or aid that is exempted under a block exemption, can be compatible, as aids, such as environmental aid or aid for R & D, are normally apt to promote public policy objectives and it is doubtful whether firms in difficulty are the right vehicle to promote such objective. But that does not mean that such aid is prohibited.

Rather, if financial support is for example given to help an ailing company to comply with environmental standards it should simply be considered as restructuring aid.

Another difficulty is to properly quantify the amounts of State aid. There are certain rules to calculate the aid values. For instance, for direct subsidies, the Commission accepted in the past that the aid values were assessed by looking at their net grant equivalent, which reduces the subsidy by the amount of potential tax liability on the gross amount. This is however questionable, as restructuring aids are normally assessed by reference to their gross grant equivalent whereas the concept of net grant equivalent is only used in the context of regional investment aid. A net calculation makes indeed sense

for regional aid in order to compare aids in different regions with different tax systems and in order to achieve similar standards of living. This is however not necessary for restructuring firms in difficulty (which should hardly be liable for tax) where the aim is solely to achieve viability of the company with the minimum necessary amount of State aid.

Finally, for certain instruments the aid value needs to be established. For example, in case of a credit the aid is the difference between the interest paid compared with an average rate, the so called reference rate, which may need to be increased by 400 basis points or more for companies in difficulty depending on the financial risk involved (it can be up to 100% if no bank would provide the loan without a guarantee).

In the end, in order to assess the proportionality of the aid, the restructuring aid is considered and assessed on a case by case basis. The main factor is whether the granting of restructuring aid is sufficiently compensated, in particular through capacity reductions.

Compensatory measures – capacity reductions

In exchange for restructuring aid, the Commission normally requests that capacities are reduced over the restructuring period to offset the distortive effects of the aid granted. However, this must be seen against the background of the factual situation in the last century where there was a clear presumption of the existence of overcapacities. Their reduction was therefore a logical prerequisite to make any public support compliant with the common interest. Today, the focus has shifted onto the reduction of inefficient capacities. The degree of reduction can thus only be established on a case-by-case basis. Where no inefficient capacities exist also other compensatory measures may be feasible.

While the restructuring programme should indicate the historical evolution of the national capacities up to the end of the restructuring period, the emphasis should clearly be on identification of each company's capacities. The identification of an individual capacity is necessary to monitor that capacity reductions have been/will be realised. Capacities will only be considered reduced when designated facilities are permanently closed, *i.e.* where the key elements of a facility are physically destroyed so that they cannot be restored to service.

In the past, the reduction in capacity was considered mainly at an aggregated national level. Although this may very well have been the motivation and starting point for many restructuring programmes, it is *de jure* not enforceable. Instead, a capacity reduction can only be requested from companies that have received aid. Only for them concrete capacity reductions are negotiated and can be remedied by recovery of State aid in case of non-compliance. Other companies, which have not received State aid, must in a market economy remain free to do what they want and may thus also increase capacity.

Scope of a restructuring programme

The scope of a restructuring programme follows mainly from the above analysis. The companies participating in the programme are selected by the Government depending on being eligible in view of the prospect of viability and proportionality.

The length of the restructuring programme, *i.e.* the restructuring period also follows from the timing for achieving viability. To this end, the programme must be as short as possible. In any event, a limited period of ideally five years is recommended in order to work with realistic assumptions.

Moreover, the restructuring period does not need to be identical with the grace period within which the granting of aid is permitted. It is rather logical that the restructuring period will be longer, as viability is so to speak the fruit of the State aid. Furthermore, restrictions on capacity should generally last at least throughout the restructuring period.

Conclusions

Not only because of the very favourable economic conditions in the steel sector, restructuring of the steel industry in most of the new EU member States can so far be seen as a success. Inefficient capacities have been closed, privatisation has been achieved in most new member States and it seems that many companies will restore viability. However, the steel industries still have to increase their efforts and make the scheduled investments, and should not rely on a continuation of the positive economic situation.

The Commission will continue to closely monitor the results. Moreover, the Commission will follow up cases where member States do not comply with the restructuring programmes, in particular where aid is given to companies which are not foreseen as beneficiaries in a restructuring programme (also if they are situated in countries that have not made use of the possibility of a restructuring programme).

Chapter 9. Reforming Counterproductive Subsidies in Austrian Transport

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Introduction

A range of economic policy measures or supports has been implemented in order to enhance the competitiveness of certain regions, processes or products in the OECD countries. Within the OECD – and initially triggered by the ministerial council of the G-7 – the potentially large benefits of reform or removal of counterproductive support measures have been underlined. This conclusion was arrived at after extensive research. According to the OECD (1998):

> *"The benefits and costs of all kinds of financial supports and regulations that are put in place to enhance the competitiveness of certain products, processes or regions, and that, together with the prevailing taxation regime, (unintentionally) discriminate against sound environmental practices".*

In summary, the OECD finds that subsidy reform is a potential "win-win" policy in that it may benefit both the economy and the environment. For a range of measures, support can have weak beneficial effects on incomes, growth and employment in the intended recipient sector, while having strong adverse effects on the environment.

The nature of subsidies to transport

One economic sector, where such support measures are of particular relevance is the transport sector. Overall underpricing in freight and passenger transport implies the granting of public subsidies to this sector, thus enhancing its activity level and the correlated environmental impacts. Further, a range of particular regulations, such as exempting all private and public transport land from land tax obligation or granting higher tax allowances for individual motorized transport than for public transport, subsidises the transport sector as a whole and/or induces modal shifts towards the environmentally less favourable modes of transport.

Historically speaking, the implementation of favourable conditions for transport activities was seen as a means of ensuring economic growth in benefiting from the various positive externalities generated by transport. However, as a recent study on the interlinkage between transport and economic growth concludes, "it is important to

distinguish the changing nature of this relationship in countries at different stages of development" (Vickerman, 2001).

After a brief review of historical studies, one scholar has come to the conclusion that "it is difficult to conclude explicitly that transportation development necessarily induces economic growth even when the economy is in the developing stage" (Berechman, 2001). For mature economies, five major trends in the transport sector relative to society and the economy are identified:

- the declining share of work related trips;
- the spatially and temporally more varied distribution of work journeys;
- the restructuring of the economy towards knowledge and information based activities less dependent on transport;
- demographic changes increasing the proportion of the elderly with respective changes in transport demand and;
- environmental impacts of transport.

All the above "are taking place in contemporary Western economies [and] make them less susceptible to transportation improvements". As the reasons for granting transport a particularly favourable status are increasingly disappearing in mature economies, reform of the environmentally counterproductive impacts resulting from this status becomes all the more urgent.

This paper summarises a full report which analyses in detail which "support measures" are present in Austrian transport, how they are effective, their quantitative importance, and finally, which reform options are available. Support measures affecting transport can be split into those of an institutional and those of a financial or tax related nature.

Institutional support measures

In Austria, the most important transport-enhancing regulations are: (a) parking area construction obligations in provincial construction law, (b) provincial funding schemes for housing construction and development, and (c) provincial land use regulations.

Provincial construction laws throughout the country include the obligation for the construction of parking areas for private cars when new homes or firm sites are constructed. This obligation is independent of both actual demand and public transport availability. It raises home construction costs and actually represents an indirect subsidy for private car use by reducing direct parking costs for private vehicles.

Provincial funding schemes for housing construction and development to date exist largely without any reference to public transport accessibility. While closeness to public transport cannot be seen as a major criterion in such support schemes, it could still attain some significance as a useful additional criterion if subsidy rates were to be raised for building close to areas well-served by public transport and vice-versa. Whether such bonus/deduction schemes could effectively influence choice of construction location remains an open question.

Similarly, but probably much more effectively, land use regulation (which in Austria is again set at the provincial level of government) hardly ever differentiates between

transport networks for public versus those for private transport. In effect, this fosters the development of a more dispersed community structure, which is then no longer servable by public transport. Such regulation can thus be seen as fostering one specific mode of transport, i.e. private car transport.

Financial and tax support measures

The most important financial and tax regulations implemented in Austria which act to enhance transport activity are: (a) fixed tax allowances for commuters, (b) fixed rate tax deductions per kilometre for business use of private cars, (c) public financing of the transport infrastructure, and (d) land tax exemption for land used for transport.

Fixed tax allowances for commuters currently increase with distance from work and decrease when the use of public transport can be expected of the commuter. In total, there are seven levels of deductions. Overall, this tends to work in favour of longer commuting distances and may also foster private car use.

Fixed rate tax deductions per kilometre to cover the use of the private car for business activities are higher than possible deductions for other land-bound modes of transport. This not only distorts incentives towards the use of private cars on business trips, it also acts to encourage people to artificially raise the share of business travel so that a higher percentage of the fixed costs for private travel becomes eligible for tax deductions.

The infrastructure used by motorized individuals (freight and passenger transport) and by public passenger transport is financed by the public. For rail bound public transport, partial public financing is generally in effect. While transport related tax revenues are not earmarked, they can nevertheless be counterbalanced to the before mentioned infrastructure investment costs, but under full cost accounting do not cover all the costs of transport induced activity. Thus, overall transport activities remain subsidized. This effect is greatest in road freight transport.

One example for external costs that are easy to track down and that are not covered by the transport sector is the partial coverage of medical costs related to traffic accidents by public health insurance, since obligatory car insurances only cover 65% of the incurred cost.

Finally, all land used for road and rail infrastructure is exempted from land tax liability. Especially when considering road infrastructure privatisation it becomes evident that this regulation may be worth to reconsider. Currently, transport activities in general are thus less taxed than other economic activities, implying a distortion in the economic structure.

Quantification of support measures in transport

The quantitative importance of the above mentioned support measures is given in **Table 1**.

Table 1. Quantitative relevance of support measures in transport

Measure	Effective Support [Mill. Euro per year]
Parking construction obligation	170 – 200 (lower bound)
Public funding schemes for housing constructing and development	100 (lower bound)
Zoning regulations	85 – 170
Fixed tax allowances for commuters	36
Flat rate tax deductions per kilometre	100
Road infrastructure financing	11,300
Accident health cost coverage	84
Land tax exemption for transport land	100 – 130

Suggestions for reform

Parking construction obligations

A reform of provincial construction law offers – beyond core construction legislation – to complement a comprehensive parking policy and incentives for motorized individual transport. A complete abolishment of the obligation to supply parking area seems not useful. The report suggests, however, to allow for the use of exemption payment revenues for public transport financing in all Austrian provinces. Furthermore, local communities should be given the option to reduce the obligatory number of parking lots without exemption payment obligation. For a construction site that is well served by public transport this reduction could become effective. A criterion for sufficient public transport serving could be the distance to the nearest reasonably served public transport stop being below 500m.

For employee parking policy the report further suggests the implementation of an instrument, that is in operation in California, "Parking Cash-Out". Within this scheme, employees that commute without their own car are granted a tax deductible compensation payment for not requiring a parking lot.

Public funding schemes for housing construction and development

Although zoning regulation is largely to blame for an explosion in activities in the outskirts of big cities and thus for inducing greater traffic, such environmentally counterproductive activities are highly subsidised by residential funding schemes. Since these schemes proved to be highly effective in inducing the use of energy efficient constructing methods, the report suggests expanding such schemes to cover the domain of transport policy, too. It is suggested that funding of residential property be reduced by 20% if the construction site is not within 500m of a public transport connection.

Zoning regulations

The report suggests a number of fiscal instruments to reduce the environmental counterproductivity of the current zoning regulations. Also, small lots of land within zones that are devoted to construction activities, but currently not used, should be included in the tax scheme on land value to prohibit zoning of further and further areas of free land before the currently zoned land is used for construction.

Tax deductibility for commuters

With regards to flat rate deductibility of commuter expenses the report suggests reducing the number of schemes to one, to cover all modes of transport. This would have the effect that the same lump-sum deductible would hold for any mode of transport and the incentive to buy and use a private car would be abolished. However, should an individual incur actual costs from commuting that are higher than prescribed by this scheme, for legal reasons the person must still be allowed to claim a deductible equal to the actual cost.

Mileage flat tax deductibility

In order to reduce the incentive for individuals to use private vehicles extensively for business activity, the report suggests only allowing a tax deductibility that covers variable cost and not fixed cost. Since variable costs for using a car are roughly equivalent to other modes of land-bound transport this simple reform would do away with the distorted incentives.

But tax deductibility is only one aspect of the regulations currently in place. How much the public authorities actually pay their own employees, when they use their private cars for professional purposes, is at least as important in terms of its environmental impact, since the allowances paid to civil servants are observed as signals that are closely followed by the private sector. A reform of these allowances, which are currently high in comparison to international standards (€ 0,36 per km), could also reduce such payments to a level sufficient to cover variable costs only. For private cars that are used very frequently for professional purposes, the employer may well want to participate also in the fixed costs of car upkeep, but this should be made in a lump-sum payment rather than an additional fee per kilometre, since no incentive should be allowed to increase mileage.

Public financing of road infrastructure

To correct for the underpriced supply of road infrastructure, the introduction of a distance- and emission-dependent road pricing system is required. For Austria, the implementation of a road pricing system accounting for external costs rising stepwise up to 2015 has been considered feasible. In freight transport, for example, a full cost internalisation results in a tax rate of 0.078 €/tkm (1.07 ATS/tkm).

Insurance coverage of accident costs

The simplest internalisation of this type of external cost imposed by the transport sector on the public would be the obligatory coverage of accident related health costs by car liability insurance.

Land tax exemption for transport land

One simple measure that would end the negative environmental impact of land tax exemptions on transport land, is to abolish the exemption. However, this will not be effective, where streets are owned by local authorities who also have tax sovereignty. On the other hand, in cases where privatisation of motorways or the introduction of road pricing are being considered, land tax should not be neglected as a means of reducing distortions among various sectors of the economy.

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Subsidy Reform and Sustainable Development

ECONOMIC, ENVIRONMENTAL AND SOCIAL ASPECTS

Subsidies are pervasive in OECD countries and are among the most powerful public policy instruments. But they often introduce unintended consequences, such as budget deficits, pollution, unemployment and trade distortions.

Subsidy reform depends on better understanding of their economic, environmental and social costs and benefits at national and international levels. Such an integrated perspective on subsidies can lead to greater transparency about their impacts and can also provide a range of arguments for overcoming vested interests to prompt subsidy reform.

This report contains the proceedings of an OECD workshop on subsidy reform held in October 2005 under the auspices of the OECD programme on sustainable development. It provides an overview of approaches for assessing subsidies and associated taxes, and looks at country experiences in reforming subsidies in the agriculture, fisheries, industry, and transport sectors.

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