A joint initiative of Ludwig-Maximilians-Universität and the Ifo Institute for Economic Research

CESifo Forum

Spring 2003

Volume 4, No. 1

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A. Denny Ellerman
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F. Schneider/A.F. Wagner
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Johann Wackerbauer

Pro and Contra

The EU Proposal

Axel Michaelowa/
Sonja Butzengeiger
Günter Röder

Special

Credit Crunch
Frank Westermann

Retail Bank Interest Rate
Gabe de Bont

Constitution for Europe
Hans-Werner Sinn

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World Economic Survey

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CESifo Forum ISSN 1615-245X
A quarterly journal on European issues
Publisher and distributor: Ifo Institute for Economic Research e.V.
Poschingerstr. 5, D-81679 Munich, Germany
Telephone ++49 89 9224-0, Telefax ++49 89 9224-1461, e-mail ifo@ifo.de
Annual subscription rate: €50.00
Editor: Heidemarie C. Sherman, Ph.D., e-mail sherman@ifo.de
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Focus

TRADABLE PERMITS

Tradable Permits – a Market-Based Allocation System for the Environment
A. Denny Ellerman 3
Tradable Permits and Other Environmental Policy Instruments – Killing one Bird with two Stones
Nick Johnstone 8
Tradable Permits – Ten Key Design Issues
Friedrich Schneider and Alexander F. Wagner 15
Tradable Permits with Imperfect Monitoring
Juan-Pablo Montero 23
Emissions Trading with Greenhouse Gases in the European Union
Johann Wackerbauer 28

Pro and Contra

THE EU PROPOSAL FOR EMISSIONS TRADING: A REASONABLE APPROACH?

Pro: Emissions Trading for Efficiency, Environmental Protection and Equity: The Cornerstone of EU Climate Policy
Axel Michaelowa and Sonja Butzengeiger 33
Contra: Many Open Questions
Günter Roeder 35

Special

The Credit Crunch: A Comparison of Germany and Japan 36
Has the Retail Bank Interest Rate Pass-through been Atypical in 2002? 42
A Constitution for Europe – Comments and Proposed Corrections 47

Spotlights

Germany's Military in Need of Modernisation 50
Does Islam Retard Economic Growth? 51

WES

World Economic Survey 52

Trends

Statistics Update 60

Conference Report

European Spring Conference: Prospects for the European Economy 2003 63

Tradable Permits

Tradable Permits – a Market-Based Allocation System for the Environment

A. Denny Ellerman*

Environmental concerns are as old as Man, but tradable permits are a relatively recent innovation in dealing with these problems. Barely forty years have passed since the basic idea underlying tradable permits was stated by Coase (1960), who noted the reciprocal nature of harmful effects and suggested that their regulation might be accomplished as effectively and efficiently by a market as by the more conventional forms of regulation. Another decade would elapse before this insight was elaborated and applied specifically to environmental problems (Crocker, 1966; Dales, 1968; Montgomery, 1972). For another two decades, economists promoted tradable permits as a policy alternative, but the concept was generally regarded as impractical despite its theoretically attractive properties. Only in the last decade have tradable permits been implemented and declared a success, mostly in the United States, where they are still the exception, but also increasingly in Europe. An obvious question is whether the current enthusiasm for tradable permits reflects a passing fad or a more enduring trend. This article seeks to provide a perspective that will enable readers to answer that question.

What is a tradable permit?

In its most general use, a tradable permit can be defined as a transferable right to a common pool resource. A common application is individual tradable quotas (ITQs) for fishing rights, which are granted in quantities to preserve the fishing stock and to avoid over-exploitation. In environmental applications, the common pool resource is air or water that does not contain concentrations of substances that harm human health or that degrade air or water quality in some manner. A narrower and more specific definition for environmental applications is then: a transferable right to emit a substance that can create pollution. Implicit in this definition, and in the concept of tradable permits, is the notion that some level of emissions does not create pollution, just as some level of fishing does not constitute over-fishing.

The permits that implement command-and-control regulations, what I will call conventional environmental permits, are a type of operating permit that specifies conditions concerning discharges that must be met for a particular facility to operate, or for a vehicle to be sold and operated. These permits typically cover a variety of emissions and they may set standards for each, perhaps limiting emissions to some relatively low rate per unit of input or output, or prescribing certain technologies or practices, which will have the same effect. They are attached to the facility or vehicle; they aim at controlling substances that can contribute to pollution; and they implicitly grant rights to emit the substance so long as permit conditions are met. Tradable permits differ from these conventional permits chiefly in focusing on a single discharge and being transferable. Transferability implies that the potentially polluting discharge can be identified and separated, or unbundled, from the underlying environmental permit. As such, transferability imposes specific requirements on tradable permit systems that are not necessarily required for conventional environmental regulation.

A tradable permit focuses on a simple discharge and are transferable

Types of tradable permits

Tradable permits can be classified into three distinct forms – credit trading, averaging, and allowance trading – and distinguished by their relation to a conventional environmental permit.[1]

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[1] This typology is used and explained in greater detail with examples in Ellerman, Joskow, and Harrison (2003).

Credit Trading is the form closest to the conventional permit. A facility that does more than required to meet the conditions of its permit may get credit for its extra effort and that credit can be transferred to another facility that is thereby excused from fulfilling the condition of its permit in like amount. As the name implies, credit trading awards exemplary behavior and allows compensating regulatory relaxations of a common requirement. A distinctive feature of credit trading is certification, the process by which the regulator determines that credit-worthy activity has occurred and that the credit can be transferred. Certification has been a problem in that the regulator usually seeks to ensure that a facility will not receive credit for what it would have done "anyway," since granting credit in this case would lead to higher emissions by the firm to whom the credit is transferred. The transaction costs associated with certification have been high and have often overwhelmed the cost savings from the proposed trades. As a result, even when credit trading has been made a feature of environmental regulation, few trades have been observed. As noted by Shabman, Stevenson, and Shobe (2002), credit trading is an extension of conventional command-and-control regulation that keeps firm-level abatement decisions in the hands of the regulator.

Credit trading rewards exemplary behavior, but requires costly certification

Averaging constitutes a further step away from the underlying environmental permit in dispensing with certification. It can be seen as automatic credit trading in which parties that do better than required in their permits automatically receive credits that can be used by others without any question from the regulator whether the firm generating the credit would have reduced emissions anyway. The pre-existing standard about which emissions are traded is still in place, but in dispensing with certification, the regulator no longer attempts to make the abatement decision at the level of the firm. The common standard or technology is simply a reference point or benchmark about which differences are traded. Although averaging is a more precise term to describe what actually occurs, European terminology tends toward various formulations containing the term "relative," which imply trading around a limit relative to input or output instead of under an absolute cap as in an allowance system.

Averaging is credit trading without certification

Allowance Trading is also known as cap-and-trade, so called because of the absolute cap on emissions and the ability to trade emissions under the cap. Although a logical progression from credit trading and averaging, allowance trading is in several ways a radical departure. For one thing, the compliance requirement is entirely different. Instead of determining compliance by reference to a common standard and sanctioned or compensated deviations from it, firms are required to surrender a permit for *every* unit of discharge. Although the cap may be very constraining in the aggregate, no firm is expected to meet any specific standard. It must only obtain and surrender an allowance that can be readily bought or sold in the market. In effect, allowances have become essential inputs into production subject to the same marginal cost calculations as other inputs.

Allowance Trding is radically different in that it must observe an absolute cap on emissions

Two consequences flow from the allowance trading form of tradable permit. First, the regulator's task is not to specify an emissions standard, but a cap. This requires initial decisions concerning 1) an acceptable or optimal quantity of emissions and 2) the limits to trading, both spatially and temporally. Second, the rights to discharge are now explicit and must be allocated in some manner instead of being implicit and granted without question to the owners of the emitting facility.

These three forms of tradable permits can be seen as a progression from a centralized system in which abatement decisions throughout the economy are the sole province of the regulator to a more decentralized, "property rights" system in which firms take over the abatement decisions subject to the constraints of the cap and its spatial and temporal dimensions, which only the regulator can (and should) decide.

Requirements for an effective system

As the most evolved form of a tradable permit system, allowance trading has prerequisites that differ in important aspects from what conventional command-and-control systems require. Some of the requirements of allowance trading are shared by averaging and credit trading systems, but not all or to the same extent. These prerequisites follow logically from the transferability of tradable permits and from the nature of allowances and the cap in allowance trading systems.

Measuring emissions is perhaps the most radical requirement of tradable permits for many, if not

most, environmental programs do not determine compliance by the actual measurement of emissions. Compliance consists of installing and operating certain equipment, engaging in certain practices, or limiting certain inputs, all of which will reduce emissions, if enforced and implemented continuously. In contrast, tradable permit systems require measurement and continuous monitoring of the regulated emissions; otherwise there is no way to determine compliance or to define what is to be traded.[2] Although obvious, measurement is not always feasible and the growth in tradable permits is in part the result of changes in the ability to monitor, and the cost of doing so, that are associated with the late 20th century changes in information, control and sensing technology (Kruger, McLean, and Chen; 2000).

Allocating emission rights is a prerequisite of allowance trading only, although rights to emit are implicit in both credit trading and averaging, as they are in conventional environmental permits. Deciding who is entitled to receive these allowances is a matter of some consequence and great controversy.[3] Allocation involves a two-level decision, first, whether to auction the permits or grant them gratis to various entities, and then how to distribute the auction revenues or permits, as the case may be. Claimants for this rent have not been wanting and a considerable literature has developed on the optimal use of the scarcity rent created by the cap.[4] The pros and cons of various methods of allocation is well beyond the scope of this paper, but the fight over prospective rents – which combines unadorned rent-seeking with high principles of equity and efficiency – can be both an obstacle and a means of gaining consensus, as evidenced most recently in the negotiations surrounding the proposed EU Emissions Trading Directive (Council of the European Union, 2002). This controversy is largely avoided in credit trading and averaging because, ironically, the implicit assignment of the rent to the incumbent in the underlying command-and-control system of regulation is not raised and never challenged.

Defining pollution. All environmental regulatory systems presume some definition of pollution, but none are required to define it as specifically as cap-and-trade systems. Not only must the potentially polluting discharge be separately identified, but at least in theory the amount constituting pollution must be determined, as well as the spatial and temporal relation of discharges to the harmful effects. This requirement is faced by all environmental regulation, but the connection between emissions and the problem justifying the emission constraint is usually less direct. For instance, technology standards are prescribed not because they fit the problem but because they usually represent the "best" that can be done at the present, and that will contribute to the problem's solution, at the least, and perhaps eliminate it. While in theory the cap should be the level that will avoid harmful effects, an increasingly frequent solution is that the cap is set at a level that would be achieved if some "best" technology were to be required of all, or, especially in the case of greenhouse gas controls, at a level that is presumed to be a step in the direction of reducing emissions to some ultimate goal.

Increasingly the cap is defined by best practice rather than environmental effects

Why tradable permits?

A fair question today in response to the attention being given tradable permits is: Why? Or alternatively: Why not taxes or conventional regulatory measures?

By far the more common policy instrument for achieving environmental goals is what has come to called command-and-control regulation, namely, the mandating of specific technology or other emission standards that are presumed applicable to all sources. The reasons for relying on conventional regulatory measures heretofore are easy to enumerate. Both taxes and tradable permits require emissions to be measured so that, if measurement is not feasible or it is costly, the only alternative is to prescribe the appropriate abatement technology or set of practices and to set up the enforcement regime that will lead to acceptably continuous application. Then, in the early days of modern environmental regulation, the sources of pollution were easily identifiable in being mostly large and stationary, which made it easier to pre-

[2] Credit trading could occur without measurement since the creditable reduction and the transfer depend entirely on regulatory determination. For instance, a regulator might allow a firm to meet a less stringent standard at one facility if it installs technology that is expected to reduce emissions more than required at another facility, without actually measuring emissions at either facility.
[3] When trading is allowed, the receipt of the right is distinct from its exercise. If allowances are freely granted, or "grandfathered," to incumbents, the recipient and the user are often the same, but the two functions remain distinct. In deciding to use a grandfathered allowance, the recipient-user is incurring an opportunity cost and effectively paying himself as *rentier* for the use of the permit. Were he not to use the permit, he could sell the permit and collect the rent as income.
[4] See, for instance, Harrison (1996), Goulder et al. (1999), and Dinan and Rogers (2002).

scribe appropriate abatement. Also, when faith in the capability of expert government agencies was greater than it is now, there seemed less reason to question this approach.

Those circumstances are increasingly less applicable on both sides of the Atlantic. The ability to measure emissions at relatively low cost has been greatly reduced by improvements in sensing and information technology. The big, initial pollution problems have been satisfactorily addressed, and the problems now facing modern post-industrial societies are far more complex and less obvious. Finally, experience and the rise of public choice literature has diminished confidence in the efficiency and equity of direct government intervention and led to a search for more effective, efficient and equitable approaches.

As market-based instruments, environmental taxes have the same efficiency attributes of tradable permits in leaving abatement decisions to firms, but they have been regarded as non-starters in the United States, and although more used in Europe, taxes are far from being the prevalent mode of environmental regulation. The reason for the apparent preference for tradable permits instead of taxes probably resides in the domain of political economy. For one thing, taxes appropriate to the state the scarcity rent that is embodied in tradable permits.[5] Moreover, the usual alternative to tradable permits is not an environmental tax but some form of conventional environmental regulation, which has the merit – from the standpoint of incumbents – of unobtrusively endowing them with the entitlement to the scarcity rent. The title is not as secure and it is not separable from the facility for which the environmental permit applies, but better an encumbered entitlement than none at all, or one that has to be bought. From this standpoint, tradable permits are worth considering, perhaps not so much because of their efficiency properties, but because they offer the possibility of unbundling the right from the facility and monetizing it directly.[6] If incumbent emitters had no voice in societal decisions, the choice of instrument would not be a matter of concern, but they do. In Europe, one should recall the frequent exemptions from energy or environmental taxes for energy-intensive industries, always because of "competitiveness" and what is invariably industry's willingness to accept equivalent, conventional, regulatory constraints that allow them to retain the scarcity rent. For these participants in the political system, taxes are the least preferred alternative and tradable permits are acceptable, even in cap-and-trade form, if the scarcity rent that the inefficient, default command-and-control system would award them, is not disturbed.[7]

Although as efficient as environmental taxes, tradable permits allow the emitters to retain the scarcity rent

Whither tradable permits?

Two different approaches have been taken in adopting and implementing tradable permit systems. The first is what might be called the *de novo* approach whereby a new regulatory system is developed usually to deal with a new environmental problem, or at least one that is not dealt with directly by the existing system of environmental controls. The US Acid Rain Program and the proposed EU GHG Emissions Trading Programs are salient examples. These *de novo* programs invariably draw the most attention and their adoption is usually time-consuming and contentious for the very reasons that have been mentioned above. The nature of the environmental problem, the level of the cap, and the allocation of allowances are all likely to be matters of lengthy debate in any democratic society; however, once consensus is formed and a decision made, these programs can be implemented relatively quickly and effectively.

The other approach, which can be observed currently only in the United States, is one in which a tradable permit system supplants an existing conventional regulatory program. These programs arise when regulators realize that the goals of the conventional environmental program cannot be achieved, despite ample authority, usually because the specific targets of control are not as obvious as they were in the first wave of environmental regulation or because the economic and political costs of implementing the program as prescribed are too high, or even infeasible. Examples in the United States are the Northeastern NO_x Budget Program

[5] The Swedish NO_x emission tax is a notable exception that supports the point. The revenue from the tax on NOx emissions is returned to incumbents on a basis other than current emissions.
[6] The rents in conventional regulation are capitalized in the facility to which the permit is attached. This value accounts for a portion of the usual excess of the sale price over book value for many existing powerplants, refineries, and other industrial facilities.

[7] Perhaps, no better current example exists that the recent (December 2002) compromise concerning auctioning and grandfathering in the EU Emissions Trading Directive. Despite strong arguments in favor of auctioning, at least 90% (i.e., not excluding all) of the permits will be grandfathered, that is, distributed gratis to incumbents.

and the RECLAIM programs in the Los Angeles Basin, for both of which the caps are set at levels that would have been achieved, in theory, by the existing command-and-control systems. In recognizing the impracticability of the detailed regulation to reach these goals, the regulator opts to attain the environmental goal by abandoning the pretense of making firm-level abatement decisions. A notable feature of this path, which is implemented by regulatory agreement and not by legislation, is that the rights to emit are retained by the incumbents, as they would be, had the default command-and-control system been practicable. The end result is that the tradable permit system quietly supplants the default command-and-control system.

A familiar analogy

The development of tradable permits recalls a similar, much earlier common pool resource problem that all societies have had to confront: land. Like clean air and water, land was once freely available for the taking, but the increase of human activity made it scarce and all human societies have had to devise institutions to allocate the scarcity. Over the centuries, societies of widely differing historical and cultural traditions have devised institutions to distribute the rights to the use of land, and the rents that go with them. For advanced industrial systems, hardly anyone questions that a decentralized system of private property rights provides a better allocation than any other practicable method of managing this scarcity. The initial allocation of these rights may have been coercive and unfair, but that ancient act is lost in the mists of history and no one really cares now, even though a significant portion of everyone's lifetime income is devoted to acquiring the right to call a small piece of the earth home. Until recently, private property rights in land were strongly contested by some and large societies have attempted to implement systems that would manage the scarcity through centralized allocation, but they succeeded only in proving the incapacity of such an approach. The question now is whether the current common pool resource problem, the environment, can be dealt with any more successfully by centralized methods. If not, we should not be surprised to observe a similar decentralized, property rights system for the environment.

References

Coase, Ronald H. (1960). "The Problem of Social Cost." *Journal of Law and Economics*, III (Oct), 1-44.

Council of the European Union (2002). "Amended Proposal for a Directive of the European Parliament and of the Council establishing a scheme for greenhouse gas emissions allowance trading within the community and amending council directive 96/61/EC" 19435/02, 11 December.

Crocker, Thomas D. (1966). "The Structuring of Atmospheric Pollution Control Systems" in *The Economics of Air Pollution*, (ed., Harold Wolozin). New York: W.W. Norton.

Dales, J. H. (1968). *Pollution, Property and Prices*. Toronto: University Press.

Dinan, Terry and Diane Lim Rogers. 2002. "Distributional Effects of Carbon Allowance Trading: How Government Decisions Determine Winners and Losers." *National Tax Journal*. Vol. 55, No. 2, June.

Ellerman, A. Denny, Paul L. Joskow and David Harrison, Jr. (2003). *Emissions Trading: Experience, Lessons, and Considerations for Greenhouse Gases*. Washington: Pew Center on Global Climate Change.

Goulder, Lawrence H., Ian W.H. Perry, Robert C. Williams III, and Dallas Burtraw. 1999. "The Cost-Effectiveness of Alternative Instruments for Environmental Protection in a Second Best Setting." *Journal of Public Economics*. Vol. 72, No. 3: 329–360.

Harrison, David, Jr. 1996. *The Distributive Effects of Economic Instruments for Global Warming*. Paris: Organization for Economic Cooperation and Development.

Kruger, Joseph A., Brian J. McLean, and Rayenne Chen (2000). "A Tale of Two Revolutions: Administration of the SO_2 Trading Program," in *Emissions Trading: Environmental Policy's New Approach* (ed., Richard Kosobud). New York: John Wiley & Sons, Inc.

Montgomery, W. David (1972). "Markets in Licenses and Efficient Pollution Control Programs." *Journal of Economic Theory* 5 (Dec), 395–418.

Shabman, Leonard, Kurt Stephenson and William Shobe (2002). "Trading Programs for Environmental Management: Reflections on the Air and Water Experiences." *Environmental Practice* 4 (3): 153–162. (September).

Tradable Permits and Other Environmental Policy Instruments – Killing one Bird with two Stones

Nick Johnstone*

Economists have long made the theoretical case for the use of tradable permits (TPs) as an environmentally effective and economically efficient means of addressing environmental externalities. This has been given increased empirical support with the successful introduction of a number of schemes in the United States over the last two decades, with the SO_2 Allowance Trading Program being the most visible recent example (see OECD 2002 for a discussion of some recent programmes). Moreover, a number of other countries have started to introduce TP systems as well, for a variety of different types of environmental impacts. In the area of CO_2 this has been given increased impetus with the endorsement of TPs within the context of the Kyoto Protocol, most particularly by the European Commission which has prepared a draft directive on GHG emissions trading.

Tradable permits are rarely "stand-alone" schemes

However, TP schemes are almost never introduced as "stand-alone" schemes. They co-exist with – and interact with – other environmental policy instruments with the same, or very similar, environmental objectives. A key public policy issue is, therefore, to evaluate when and whether it makes sense to use two instruments to hit one target. This paper seeks to examine this question by analysing some of the potential interactions between TPs and other environmental policy instruments. It does so with reference to four other types of instrument which frequently interact with TP schemes: direct regulations such as performance and technology standards, environmental taxes or charges, subsidies for abatement inputs or capital equipment, and voluntary policy approaches.

Tradable permits and direct regulation

In many senses most TP regimes have emerged out of direct forms of regulation. The original American EPA Emissions Trading Program is the clearest example of such a case. However, even more recent TP schemes have been underpinned by pre-existing regulatory schemes. In some cases, this is primarily of importance for distributional reasons. For instance, under Los Angeles County's RECLAIM program for NO_x and SO_x, permits were allocated *gratis* to firms according to estimated emissions that would have arisen under the regulatory system that it replaced.

In other cases the effects are much more far-reaching. This is particularly true of baseline-and-credit schemes in which credits for emissions reduced are the units which are traded, rather than permits for emissions actually generated. Under such schemes, it is important to be able to determine when an emission which would have otherwise been emitted is deemed to have been abated. Some notion of a 'baseline' level of emissions is, therefore, the point against which the credit is generated.

In most baseline-and-credit schemes the baseline is that level which would be emitted if the firm complied with the existing regulatory system. For instance, under the EPA's Clean Air Act's Emissions Reduction Credit Program credits are created when firms reduce their emissions below the level allowed by their operating permit (see Hahn and Hester 1989). Similarly, in the Swiss VOC permit trading program in the Canton of Basel in Switzerland which was initiated in 1993, credits were created for emission reduction below the emission performance standard (75 mg/m³)[1] (see Jeanrenaud 1999). And finally, under the American Lead-in-Gasoline trading program,

* National Policies Division, OECD Environment Directorate. This report represents the views of the author and not the OECD or its member countries.

[1] Although in practice very few credits have been created due to the stringency of the standard.

Box : The Costs of Regulatory Constraints on Permit Trading

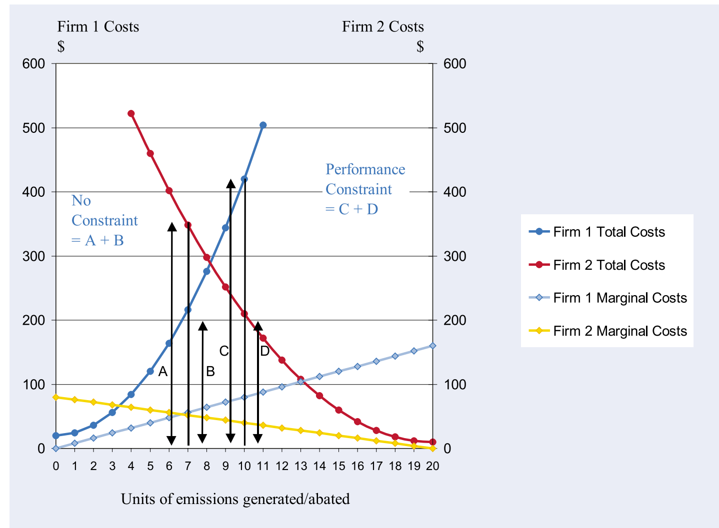
The costs of introducing a regulatory constraint (a minimum performance standard) on a firm within a permit trading system can be illustrated with a hypothetical permit trading market. Assume that prior to the introduction of any type of environmental regulation, two firms emit 40 units of a particular pollutant. The two firms have the following hypothetical total abatement cost (TAC) curves:

$$\text{Firm 1: TAC} = 20 + 4\ \text{EA}^2$$

$$\text{Firm 2: TAC} = 10 + 2\ \text{EA}^2$$

Where TAC is total abatement costs and EA is emissions abated. The figure below shows total and marginal abatement costs for Firm 1 (Firm 2) increasing from left to right (right to left) as levels of abatement rise along the horizontal axis. Upon the introduction of a TP system which caps emissions at 20 units, firms are allocated 10 permits each. Total costs will be minimised at the point at which marginal costs for the two firms are equal. This point is reached at the heavily shaded line to the left, when firm 1 buys approximately 3 units from firm 2, at a permit price of $52, and total abatement costs of $563 (the sum of the two arrows A and B).

Assume now that the regulatory authority decides to protect local environmental conditions in the jurisdictions where each of the plants are located by placing a regulatory constraint (such as a performance standard) of 10 units on firm 2. This might be a result of a concern that damages rise sharply above this level. In this case, the equilibrium is the heavily-shaded line to the right and total costs would rise to $630 (the sum of the two arrows C and D). Costs of compliance are, therefore, approximately 20% higher than in the case where permit trading is not restricted. Whether or not this results in improved economic efficiency depends upon the relationship between marginal damages of emissions from the two plants.



credits were earned if fuel was manufactured by refineries with a lower lead content than that mandated by regulatory limits. (See Stavins 2001.)

In other schemes, regulatory constraints are used to restrict the use of TPs in order to protect local environmental conditions. For instance, in the United Kingdom, the architects of the proposed programme for NO_x and SO_x trading have made it clear that the regime would have to protect local environmental conditions. However, it is not clear whether this would require the application of "Best Available Technologies" as mandated under the European Commission's IPPC Directive. This would severely restrict trading opportunities (see Palmer and Davies 2002).

Even under the American SO_2 Allowance Trading programme, some states have imposed regulatory constraints on the scope for trading in order to protect local environmental conditions. For instance, in Wisconsin, local air pollution regulations prevented generators from buying permits even though their marginal costs exceeded the prevailing permit price. In Illinois, the use of scrubbers was mandated (see Conrad and Kohn 1996 and Fullerton et al. 1997). In New York, the Department of Environmental Conservation filed a suit to force the EPA to use "deposition standards" to restrict the use of permits in environmentally sensitive areas (see Tietenberg 1995).

Adding regulatory constraints increases costs, but also benefits

What are the costs of such restrictions? Fullerton et al. (1997) estimated that applying minimum performance standards in the SO_2 program increases costs more than twofold. Farrell et al (1999) provide similar results for the American Northeast's NOx programme. (For a hypothetical numerical illustration see Box.) However, neither of these studies look at whether the benefits of constraining trade through regulatory requirements in order to protect local environmental conditions outweigh the increase in compliance costs. A single undifferentiated market would also be suboptimal, resulting in non-equalisation of marginal benefits and costs.

The key point is that because of the administrative cost of using one instrument to target the impacts

directly in a differentiated manner which allows for marginal costs to equal marginal benefits for all emitters, a combination of policies is applied.[2] If applied efficiently this can be a 'second-best' policy option. Abatement cost minimisation for a given level of emissions is achieved through the use of the TP system, while still insuring against breaches of local environmental thresholds and other non-linearities in damage functions through regulatory constraints.

In other areas, the case for the retention of regulatory constraints is less evident. For instance, it has been proposed that the use of energy efficiency standards in the European Union's IPPC be retained even after the EU Emissions Trading Scheme for greenhouse gases has been introduced. While the objectives of the energy efficiency standards are broader than just climate change mitigation – indeed, their environmental objectives are manifold – it is clear that the retention of mandated energy efficiency standards may reduce the potential gains from trade within the Emissions Trading Scheme.

In some areas, regulatory constraints reduce the potential gains of emissions trading

This can be seen by examining a typical firm's objective function. The firm seeks to maximize profits, taking into account both production costs (PC) and compliance costs (CC). The latter are made up of both abatement costs (A) and permit use (P).[3] Capital (K), labour (L), and energy (E) are used both in production and abatement. The effect of the energy efficiency standard can be seen as a constraint on the firm's choice of factor inputs. In effect, the firm will not be able to use a ratio of energy use to output in excess of (E/Q)*. The maximization problem is, therefore:

$$\Pi = P^*Q - PC(K,L,E) - CC(A(K,L,E),P)$$

$$\text{s.t. } E/Q < (E/Q)^*$$

If (E/Q)* is less than would be the ratio chosen by the firm in the absence of the constraint, potential gains from trade will be lost. In effect, the firm will not be able to optimise its permit use. If this is not the case, then the performance standard is redundant. As such, the standard can only increase (or hold constant) compliance costs. Whether or not this cost is worth paying depends upon the efficiency of the standard in meeting the other environmental objectives for which it has been introduced.

Tradable permits and environmentally related Taxes

There has also been considerable experience with the joint application of TPs and pollution taxes, particularly: as a means to reduce compliance cost uncertainty; and, as a means to capture windfall rents or tax revenue. The potential desirability of the joint application of taxes and permits (rather than using one or the other on its own) to reduce compliance cost uncertainty has been recognised for a considerable length of time. In particular, Roberts and Spence (1976) proved that the joint application of the two instruments was preferable in the presence of: A) non-linear environmental damages; and B) uncertainty concerning abatement costs. In effect, by delimiting the bounds of permit price uncertainty through taxes (and subsidies), the potential welfare losses from the regulatory authority either over-estimating or under-estimating marginal abatement costs can be reduced.

This has been dubbed the "safety valve" argument. By putting a cap on permit prices, regulatory authorities are able to convince risk-averse affected firms and households of the desirability of introducing a TP regime. In Denmark, the government explicitly used a "safety-valve" argument in setting the penalty at 40 DKK ($US 4.78)/ton of CO_2. In addition, some commentators have argued that the CFC tax in the United States was the binding instrument, and not the Ozone-Depleting Substances Program (see Stavins 2001).

It would, of course, be possible to achieve similar objectives within the TP system itself. For instance, under the SO_2 Allowance Trading program the government holds reserves of permits which it would release onto the market if the price were to reach $US 1,500 (see Tietenberg 1998). However, this has the disadvantage that the price can only be capped for as long as the reserve holds – excessive demand will eventually drive the price higher. Thus, the price effects are less certain, undermining the benefits in terms of reduced uncertainty. On the other hand, the environmental effects are more

[2] The usual economic case for the efficiency of marginal cost equalisation is really just a special case in which marginal benefits of abatement are equal across emission sources.
[3] Note that this is true even if permits are allocated gratis to the firm, since the firm will still face an opportunity cost for each and every permit surrendered.

certain with a permit reserve since under a tax-based price cap the government has no direct control over any unforeseen increase in emissions arising from the cap.

Another potential use of taxes in conjunction with TP regimes arises from the common use of gratis allocations of TPs rather than auctions. Whether this is done on the basis of historical emissions (grandfathering) or regulatory requirements or some other mechanism, firms will receive a windfall rent equal to the value of the permits allocated. In order to recover some of these windfall rents, taxes can be applied in conjunction with the TP regime. This appears to have been the motivation behind the use of the CFC tax in conjunction with the ODS Program in the United States. Initially set at $1.37/lb in 1990, it rose to $5.35 in 1995 (see Harrison 1999). This tax is paid on all CFCs sold and is complementary with the permit trading program. Thus, irrespective of the permit price, the tax has to be paid.

In a closely related vein, the desire of governments to retain at least some of the revenue from pre-existing environmentally-related taxes has also been a motivation for the joint application of taxes and TP systems. For instance, the United Kingdom's Emissions Trading Scheme for greenhouse gases co-exists with the Climate Change Levy which imposes a tax on coal, gas and electricity use on business, commerce and the public sector.

While the target groups of the two programs is somewhat different – with the ETS targeted upstream and the CCL downstream – the two policies interact in two ways. Firstly even for those downstream electricity users which are not themselves subject to the ETS, they will face price increases for electricity which are additional to the CCL. In addition, some coal and gas users will face a target under the ETS as well as be subject to the CCL (see Sorrell 2003). This results in double regulation, with externalities for at least some emissions from some sources being double-internalised.

Tradable permits and subsidies

The use of environmentally-motivated subsidies in conjunction with of TP schemes is less widespread than the use of taxes or direct regulations with TPs, but there are still some important examples. Two areas will be highlighted. Firstly, financial subsidies are sometimes provided for improved environmental performance. In some cases, such subsidies are targeted at the level of investment (i.e. capital depreciation allowances for abatement technologies); in other cases they are targeted at specific inputs or outputs (i.e. tax exemptions on sales of renewable energy); and, in still other cases they are targeted much further upstream at technology development (i.e. public support for research and development in environmentally-benign technologies).

As long as the subsidies co-exist with a cap-and-trade system they will not undermine the environmental effectiveness of the TPs. However, they will not increase the environmental effectiveness either. Moreover, they will have effects on the distribution of impacts across firms and the economic efficiency of the system. For instance, under the SO_2 Allowance Trading Progam, the public utility commissions of some states have provided favourable tax treatment for capital expenditures on scrubbers relative to expenditures on permits, low-sulphur coal and other compliance strategies (see Bailey 1996).

Subsidies are used less frequently than taxes in conjunction with TPs

The effect of the subsidy will be to distort decision-making. Affected SO_2 emitters will be encouraged to purchase scrubbers in excess of the level which would be optimal. This will not improve the environmental effectiveness of the program in a global sense, but will merely drive down permit prices by releasing permits onto the market and encouraging other firms to use permits as a compliance strategy. It will also increase overall costs, above and beyond the costs associated with the direct financial implications of the subsidy.

Secondly, in other cases the relationship between subsidies and TP schemes is more direct. Indeed, perhaps the best-known combination between a TP system and the provision of subsidies is the United Kingdom's "sellers' auction" for CO_2 emission reductions under the UK Emissions Trading Scheme (ETS) (see Kitamori 2002 for a discussion). In a decreasing-price auction firms bid for government-provided subsidies against emissions reductions relative to their baseline emissions in 1998-2000. In total £215 million in subsidies will be provided in the period 2002–2006 (see DETR, 22/03/2002). In the first auction the price for allowances was £53.37/tonne.[4] The firm can sell any

[4] This is not equivalent to the market price for the cost of abatement of a tonne of carbon due to the annual nature of the commitment and other factors.

allowances for any reductions that it undertakes in excess of the amount for which it has bid.

While the ability to sell excess allowances is clearly characteristic of baseline-and-credit TP systems, the importance of the financial incentive for participation in the scheme is significant. In effect, the bidding scheme is perhaps best understood merely as a potentially efficient means of the allocation of subsidies. Instead of granting investment funds through detailed project applications on the one hand, or in a non-discretionary manner through undifferentiated subsidies on the other hand, firms are encouraged to reveal the true costs of abatement through the auction. However, the economic efficiency of the programme is dependent upon effective auction design, such that firms are not able to behave collusively in order to minimise reductions relative to the subsidies available.

Tradable permits and voluntary approaches

Voluntary approaches make sense only if the allocation of TPs is free. Even then there are problems.

Voluntary approaches to environmental policy can be integrated with TPs in two important ways:

- Adherence to TP systems by firms can be made voluntary through the use of 'opt ins'; and,
- Emission reductions agreed to under voluntary agreements can be used as a means to allocate permits in a grandfathered TP scheme.

If the permits are auctioned, no firm would be likely to volunteer to be involved in the program in the absence of a regulatory threat or a financial inducement. In the case where permits are allocated gratis, the question is significantly more complicated since such schemes are characterised by strategic behaviour and financial uncertainty. Unlike under a mandatory cap-and-trade scheme the firm does not know what the ultimate "cap" will be, since this depends upon how many (and which) firms volunteer.

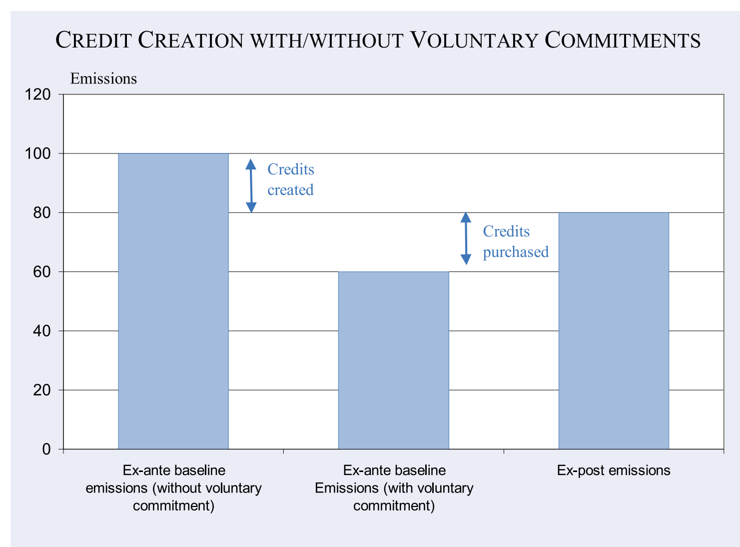
In effect, each firm faces a different expected benefit and cost schedule depending upon which other firms are involved. In some cases the net benefits will be positive and in some cases they will be negative relative to the case where they continued to adhere to some existing regulatory regime. It is possible that the distribution of costs and benefits is such that no firm will volunteer, even if it is in their collective interest to do so. Indeed, this is why the United Kingdom subsidised firms to participate in their ETS programme.

In most extant cases, however, voluntary adherence is only an option for a sub-set of firms, with most firms being mandatory participants. This is the case with the EPA's SO_2 Allowance Trading Program. It is also the case with Pennsylvania's NO_x Allowance Retirement Program which is mandatory for fossil-fuel powered electric generating plants, but voluntary for others (Stavins 2001). Similarly, under RECLAIM it is possible for mobile sources and small point sources to volunteer to become involved (see Nash and Revesz 2000).

To a great extent allowing for voluntary adherence for some firms while preserving a core of firms for which the cap-and-trade programme is mandatory simplifies the decision for the firm since if the number of potential "voluntary" firms is small relative to the number of "mandatory" firms, the permit price can be taken as given. This also means that the regulator faces less uncertainty about the likely number of firms that are to be involved.

However, even in such cases voluntary adherence can raise concerns. The case of the SO_2 Allowance Program is instructive. Between 1996 and 1999 the percentage of emissions that were attributable to "opt-ins" was between 12% and 13% (www.epa.gov/airmarkets). However, Montero (2000) found that this »substitution« provision of the program tended to be taken up by those firms which were grandfathered emissions far in excess of actual emissions. An increase of one standard deviation in the firm's allocation of permits relative to actual emissions increased the probability of "volunteering" from 32% to 84%. Indeed, the "adverse selection" effect dominated the effects of productive efficiency.

An important additional point relates to the treatment of existing "voluntary" commitments in the determination of permit allocations within TP schemes. In recent years, there have been extensive discussions in different programmes about the extent to which reductions achieved through formal "voluntary" approaches (negotiated agreements, etc…) should be included in the allocation of permits and in the evaluation of their baseline.



For instance, in the CEC's (2001) proposal for an allowance trading programme for GHGs it is stated that "the target set under the [negotiated] environmental agreements can serve as a useful basis for the allocation of allowances by Member States". This would, however, be politically difficult to achieve if the scope of the permit trading scheme is broader than the scope of the pre-existing agreement since firms which were not party to the agreement would benefit. More generally, this may raise the issue of »moral hazard«, making it exceedingly difficult for governments to negotiate agreements with firms in future due to the possibility of this affecting future permit allocations.

These ambiguities are even more important in credit-and-baseline schemes where credit creation is affected by the choice of the baseline. In some cases, the distinction may result in a switch from the firm being a net buyer rather than net seller of permits. This can be seen in the Figure, where for a given price of permits a firm shifts from being a net seller if voluntary commitments are not included to a net buyer if they are. In the Canadian Pilot Emission Reduction Trading Program, Trading Rule 2.4.3 states an emission reduction is surplus if it is not otherwise required of a source by current regulations or other obligations (e.g. a voluntary commitment). The precise meaning of a "voluntary commitment" was to be elaborated by a special Task Team. In their deliberations it was proposed that one required element for a "voluntary commitment" was that it includes a "negotiated agreement between an organization and the government and/or ENGO's such as a Memorandum of Understanding" (see Humphries 2000).

Conclusions

In practice TP systems almost always co-exist with other environmental policy instruments. In some cases (i.e to protect local environmental conditions, to reduce compliance cost uncertainty, encourage additional abatement), a case can be made for their joint application. However, in other cases the secondary instrument will be at best redundant and at worst may result in increased administrative costs, increased economic inefficiency and reduced environmental effectiveness. Thus, whenever introducing a tradable permit system it is vitally important to understand the links with pre-existing policies. In some cases adjustments may need to be made to ensure complementarity. In other cases, it may be advisable to scrap the policy altogether.

References

Bailey, E.M. (1996), "Allowance Trading Activity and State Regulatory Rulings: Evidence from the U.S. Acid Rain Program." Cambridge, MA: Massachusetts Institute of Technology, CEEPR Working Paper.

Commission ot the European Communities (2001) "Proposal for a Directive of the European Parliament and the Council Establishing a Framework for the GHG Emissions Trading within the European Community and Amending Council Directive 96/61/EC" (2001/aaaa COD).

Farrell, A., R. Carter and R. Raufer (1999) "The Nox Budget: Market-Based Control of Tropospheric".

Harrison (1999). "TPs for Air Pollution Control: The United States Experience" in OECD *Domestic Tradable Permit Systems for Environmental Management: Issues and Challenges* (Paris: OECD).

Humphries, D. (2000) *What is a Voluntary Commitment within the PERT Trading Rule?* (Toronto: CleanAir Canada).

Jeanrenaud, C. (1999) "Obstacles to the Implementation of TPs: The Case of Switzerland" in OECD *Implementing Domestic Tradable Permits for Environmental Protection* (Paris: OECD).

Kitamori, K. (2002) "Domestic GHG Emissions Trading Schemes: Recent Developments and Current Status in Selected OECD Countries" in OECD *Implementing Domestic Tradable Permits: Recent Developments and Future Challenges* (Paris: OECD).

Montero, J.-P. (2000) "Voluntary Compliance with Market-Based Environmental Policy: Evidence from the U.S. Acid Rain Program" Cambridge, Mass.: MIT Center for Energy and Environmental Policy Research, Working Paper.

Nash, J.R. and R.L. Revesz (2001) "Markets and Geography: Designing Marketable Permit Schemes to Control Local and Regional Pollutants" in *Ecology Law Quarterly,* Vol. 28, pp. 559–661.

Palmer, R. and N. Davies (2002) "Proposals for a Nox and SO_2 Trading Scheme in the United Kingdom" Paper Presented at the *CATEP Workshop on the Design and Integration of National Tradable Permit Schemes for Environmental Protection,* University College London, March 2002.

Roberts, M.J. and M. Spence (1976) "Effluent Charges and Licenses under Uncertainty" in *Journal of Public Economics*, Vol. 5, pp. 193–208.

Smith, S. (1999) "The Compatibility of TPs with other Environmental Policy Instruments" in in OECD *Implementing Domestic Tradable Permits for Environmental Protection* (Paris: OECD).

Sorrell, S. (2003) "Back to the Drawing Board?: Implications of the EU Emissions Trading Directive for UK Climate Policy", Brighton, UK: SPRU Working Paper.

Stavins, R.N. (2001) "Experience with Market-Based Environmental Policy Instruments" in Karl-Göran Mäler and Jeffrey Vincent (eds.) *Handbook of Environmental Economics* (Amsterdam: North-Holland/Elsevier Science).

Tietenberg, T.H. (1995) "TPs for Pollution Control when Emission Location Matters: What Have We Learned?" in *Environmental and Resource Economics*, Vol. 5, No. 1, pp. 95–113.

Tietenberg, T.H. (1998) "Ethical Influences on the Evolution of the U.S. TP Approach to Pollution Control" in *Ecological Economics*, Vol. 24, Nos. 2–3, pp. 241–257.

Tietenberg, T.H. (2001) *Emissions Trading Programs Vol. 1: Implementation and Evaluation* (Aldershot UK: Ashgate).

United Kingdom Department of the Environment, Transport and the Regions (2002) "Tradable Landfill Permits Consultation Paper" (London: DETR).

Tradable Permits – Ten Key Design Issues

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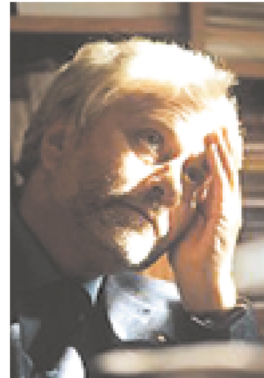

Introduction

In this paper, we provide a guide for policymakers who consider using tradable permits as an environmental policy tool. Most of the issues we discuss are relevant both in the domestic and the international realm, although some have particular significance in one of the two areas.

In recent years, tradable permits (TP) have become rather widespread in use.[1] The table overleaf gives an overview of some of the numerous experiments, in particular in the US. There is a wealth of resources available that comment on the success of these programs (Stavins 2002). One noteworthy point is that the international experience is rather small. Europe has only relatively recently begun to develop such programs. For example, in Denmark, the Ministry of the Environment fixes annual emissions ceilings in the power generation industry, and leaves the actual allocation to the country's two power plant consortia. The UK allowed intra-firm trading of SO_2-allowances among large combustion plants from 1991 to 1997. But inter-firm trading was not allowed (Sorrell 1999).

The system in the Netherlands, where electric power producers face emissions standards for SO_2 and NO_x but can comply through cost-sharing arrangements whereby plants with higher abatement costs are compensated, has resulted in intra-firm trading (Klaassen and Nentjes 1997). In Germany, the transfer of emission reduction obligations among firms in air quality non-attainment areas is allowed. The cost-savings have been estimated to be very limited (Schaerer 1994). The most recent experiment with market-based instruments is the UK Emission Trading Scheme, aimed at achieving the UK's commitment under the – yet to be ratified – Kyoto Protocol. Schneider and Wagner (2002) describe the program in detail. Since the first auction only took place in March 2002, and trading has been somewhat limited so far, it is too early to make an assessment concerning the success of the program.

What lessons can we learn from these programs, some of which have been "grand policy experiments" (Stavins 1998)? In this guide for policymakers, we focus exclusively on design and implementation issues and we draw on theoretical and empirical work on this question. Of course, there is no blueprint for the perfect system. It is our belief, however, that when tradable permit systems are used where they are appropriate, then heeding the lessons from the past increases the chances of the system leading to the desired outcome (in particular a cost-effective attainment of pre-set environmental goals). The balance of the paper deals with ten such key design issues.

Trading of emissions versus inputs

In principle, we would want to regulate risks and impacts. However, it is quite difficult to trade risks directly. This is why policy typically moves one or two steps away from this level, leading to either *emission* permit trading or *input* permit trading. For example, a true CO_2 trading program would

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Part of this paper is based on Wagner and Schneider (2003).

[1] This should not obscure the fact, however, that tradeable permits are not the only game in town. In fact, important trade-offs with alternative environmental policy instruments need to be considered. For space reasons, it is not possible to adequately deal with these trade-offs here, and so we can only point the reader to the more extensive survey (Wagner and Schneider 2003) where questions like the optimal timing of environmental policy in the presence of significant uncertainties and irreversibilities and the relative merits of different policy instruments with respect to cost efficiency, environmental effectiveness, administrative practicability, dynamic efficiency and incentives for technological innovation, and political acceptability are discussed (Summary tables of the relative advantages and disadvantages can be found in the appendix of this paper). One particularly important insight developed recently in a number of papers (Abel et al. 1995; Arrow and Fisher 1974; Chao 1995; Dixit and Pindyck 1998; Hassett and Metcalf 1994; Kolstad 1992; Pindyck 2000) concerns the fact that policy decisions with respect to climate change are essentially irreversible and delay of action is possible. Under these conditions, waiting has optionality value; thus, the observed delay in climate policy implementations may at least partially be an optimal response to the prevailing uncertainties.

Some selected tradeable permit systems (Stavins 2002)

Country	Program	Traded Commodity	Period of Operation	Environmental and Economic Effects
Canada	ODS Allowance Trading PERT GERT	CFCs and Methyl Chloroform; HCFCs; Methyl Bromide NO_x, VOC_s, CO, SO_2, CO_2	1993–1996; 1996–present; 1995–present; 1996–present; 1997–present	Low trading volume, except among large methyl bromide allowance holders
Chile	Santiago Air Emissions Trading	Total suspended particulates emission rights trading among stationary source	1995–present	Low trading volume; decrease in emissions since 1997 not definitely tied to TP system
European Union	ODS Quotat Trading	ODS production quots under Montreal Protocol	1991–1994	More rapid phaseout of ODS
Singspore	ODS Permit Trading	Permits for use and distribution of ODS	1991–present	Increase in permit prices; environmental benefits unknown
United Kingdom	Emissions Trading Program	CO_2 emissions	2002–present	Unknown
United States	Emissions Trading under CAA	Criteria air pollutants	1974–present	Performance uneffected; savings = $5–12 billion
	Lead Gasoline Phasedown	Rights for lead in gasoline among refineries	1982–1987	More rapid phaseout of leaded gasoline; $250 m annual savings
	Water Quality Trading	Point-nonpoint sources of nitrogen and phosphorus	1984–1986	No trading occurred because ambient standards not binding
	CFC Trades for Ozone Protection	Production rights for some CFCs, based on depletion potential	1987–present	Environmental targets achieved ahead of schedule; effect of TP system unclear
	Heavy Duty Engine Trading	Averaging, banking, and trading of credits for NO_x and particulate emissions	1992–present	Standards achieved; cost savings unknown
	Acid Rain Reduction	SO_2 emission reduction credits; mainly among electric utilities	1995–present	SO_2 reductions achieved ahead of schedule; savings of $1 billion/year
	RECLAM Program	SO_2 and NO_x emissions among stationary sources	1994–present	Unknown
	N.E. Ozone Transport	Primarily NO_x emissions by large stationary sources	1999–present	Unknown

correspond to the first type; a carbon (content) trading program belongs to the second group. In general, the choice between the two depends on the degree of uniform mixing of the pollutant. For example, it would be problematic to have a sulfur-content trading program because SO_2 is a highly non-uniformly mixed pollutant – which is why the US has chosen to implement an SO_2 allowance trading program. Aside from this physical property, there is also an economic or political aspect: administrative feasibility. Clearly, the closer to the actual impacts regulation takes place, the more complex it gets. Taken together, these two factors suggest an important trade-off.

Mandatory versus voluntary

Some observers have argued that a mandatory scheme is likely to be more environmentally effective. This is not necessarily true since significant emissions reductions may also be attained through

voluntary participation. What is correct, however, is that mandatory schemes will in all likelihood be more cost-effective. Why? Under a voluntary scheme only entities that expect themselves to be sellers will join the scheme (even if they end up being buyers after all). In other words, there is a strong element of adverse selection involved, as has been shown for the case of the SO_2 program by Montero[2] (1999). Thus, abatement cost heterogeneity will be lower under a voluntary scheme, leading – for a given environmental goal – to lower cost-savings. Transaction costs for companies joining industrial opt-in programs have typically been high (Atkeson 1997).

Absolute versus relative baselines

Typically, the difference between relative and absolute targets is argued to be as follows (Bode 2002): One limits total emissions to some absolute amount and may therefore limit "growth," while the other is presumed to impose less of a constraint on growth in output, albeit at the cost of some growth in emissions. As Ellerman (2002) points out, the U.S. experience with both systems does not provide much support for this distinction.[3] But it is not clear whether this experience is also relevant for the choice of baselines in climate change policy, for example. Indeed, one of the major components of the US Climate Plan announced in February 2002 is the concept of moving away from committing to a national emission cap by a specified date (such as is embodied in Kyoto) to a targeted rate of decline in emissions intensity of the economy. Kolstad (2002) argues that this part of the proposal does have some merit, on the grounds that it addresses the problem with the emissions cap approach of Kyoto that requires continual renegotiation of the caps as we proceed through time. It also does not have the (psychological and possibly real) effect of hindering growth for developing countries. Finally, an intensity target has the advantage of resolving some uncertainty, since other the absolute baseline significant cost uncertainty arises from a combination of uncertainty over how much an economy may grow by the time the commitment period arrives. The last word is still out on this issue.

Apart from this, two other reasons argue for using absolute baselines in national programs. The problem is that without a specified baseline, reductions must be credited to an unobservable hypothetical – what the source would have emitted in the absence of the regulation. Second, as was experienced with EPA's Emissions Trading Program, relative baselines create significant transaction costs by essentially requiring prior approval of trades as the authority investigates the claimed counterfactual from which reductions are calculated and credits generated (Nichols, Farr, and Hester 1996).

Grandfathering versus auction

Almost all emission trading programs in action have started with grandfathered permits. For example, the most important emission trading program so far, the Clean Air Act amendments of 1990 dealing with SO_2 trading provide for annual auctions in addition to grandfathering – but such auctions involve less than three percent of the total allocation. Overall, the auctions have proven to be a trivial part of the overall program (Joskow, Schmalensee, and Bailey 1996). This is astounding since on the theoretical level, there seem to be compelling reasons for auctioned permits.

First of all, with perfect information and no transaction costs, trading will result in the economically efficient outcome independently of the initial distribution of permits (Montgomery 1972). Second, auctions are more cost-effective in the presence of certain kinds of transaction costs. Third, the revenue raised can be used to reduce other distortions (Goulder and Bovenberg 1996). Note also that while instruments such as tradable permits can create entry barriers that raise product prices, reduce the real wage, and exacerbate preexisting labor supply distortions, this effect can be offset if the government auctions the permits, retains the scarcity rents, and recycles the revenue by reducing distortionary labor taxes. Fourth, auctions provide greater incentives for firms to develop substitutes (see the section on technological progress). Fifth, due to the revenue raised by auctions, administrative agencies may have a bigger incentive to monitor compliance (Ackermann and Stewart 1985).

[2] However, the environmental effects must be kept in perspective. The number of allowances that could be considered excess amounted to only 3% of the total issued during 1995–1999 and the inflation of the cap during the time when these banked allowances will be used is only about 2%. Thus, these effects do not appear to have threatened the overall integrity of the allowance program.

[3] On the one hand, the consumption of coal has not been perceptibly reduced by the imposition of a cap on sulfur dioxide emissions. Rather, more low-sulfur coal is produced and a number of units have retrofitted scrubbers. On the other hand, the lead phase-down, which is the prototypical averaging (i.e. relative baseline) program, has not lead to more output of leaded gasoline.

Finally, grandfathering can lead unregulated firms to increase their emissions in order to maximize the pollution rights that they obtain if there is a transition to a market-based system (Dewees 1983). Overall, under almost any circumstances to be encountered in the real world, an auction of emission rights is preferable to grandfathering.

In addition to these considerations, questions of equity but also of dynamic efficiency will guide the treatment of new sources. Obviously, the decision will depend on the competitiveness of the market – the policy decision here is as much industrial policy as it is environmental policy.

Allocations and efficiency in the international context

Chichilnisky (1993) and Chichilnisky and Heal (1994) point out that the presumption that equal marginal abatement costs are the correct condition for efficiency is not strictly correct. The reason for this is that, simply, a dollar to a person in the developing world does not have the same welfare implications as a dollar to a developed world person. What matters are the real opportunity costs. Formally, the authors find that Pareto efficiency requires that the marginal cost of abatement in each country must be inversely related to that country's marginal valuation for the private good. This has strong policy implications: If richer countries have a lower marginal valuation of the private good, then at a Pareto-efficient allocation, they should have a larger marginal cost of abatement than the lower-income countries. With diminishing returns to abatement, this implies that they should push abatement further. Summarizing, the allocation of property rights in a tradable permit system is important if environmental quality has a direct impact on wellbeing and marginal valuations of private goods differ strongly across countries.

The main policy implication for the design of efficient permit trading programs concerns the allocation of rights. Even after choosing to go with tradable permits as the environmental policy instrument, we need to carefully use the degree of freedom left in terms of the distribution of property rights.[4] Whenever politicians bring up equity issues, economists are quick to point out that those have nothing to do with efficiency. For once it seems that politicians are right, if not in their reasoning.

Banking and borrowing

The US has had significant experience with programs that allow intertemporal trading, in particular banking. Two lessons emerge from this experience (Ellerman 2002): First, when allowed and coupled with a phased-in reduction requirement, banking will be used and it will accelerate the timing of emission reductions. Studies of the US Acid Rain Program also find that firms have learned very well how to optimally accumulate and draw down banks (Ellerman and Montero 2002). Second, the ability of banking to dampen allowance price fluctuations may be important when the spatial scope of the cap is limited.[5] In fact, this second point hints at the importance of a temporal safety valve that may allow agents to borrow in times of extraordinary demand. Of course, there is good reason to restrict temporal flexibility when the environmental problem is other than a stock pollutant.

Market power and the design of emission permit markets

In order for cost minimization gains to be fully realized, the emission trading market must work in a competitive manner. If some agents have the capacity to influence the transaction price of traded permits or can prevent the entrance of competitors by hoarding permits, efficiency losses may ensue (OECD 2001). For example, Hahn (1984a) shows that the deviation of abatement costs from the cost minimum is related to the extent to which the initial distribution of permits differs from the equilibrium distribution (and to the price elasticity of demand).

Another type of strategic behavior occurs if firms use the permit market to drive up rivals' costs (exclusionary manipulation). Note first that this can only occur if firms operating in the same industry also participate in the same permit market. Misiolek and Elder (1989) conclude that, surpris-

[4] Chichilnisky et al. (2000) concentrate on the first welfare theorem in markets in which agents trade, at a uniform price (that is, not at personalized Lindahl prices), permits to produce privately produced public goods. They take the total quantity of permits fixed by the government at a level consistent with Pareto efficiency. They show that the equilibria are nevertheless generally inefficient, due to the public good character of one of the traded goods. But the main surprise is that there exist certain allocations of rights to emit from which the market overcomes the »free rider« problem and achieves efficiency. This is a key characteristic of competitive markets for privately produced public goods.

[5] This was important to bring price levels back to normal in the RECLAIM NO_x program in the US after the California electricity market crises in late 2000 and early 2001.

ingly, this may not necessarily have a negative impact on cost efficiency. It is unclear to what extent this result survives the inclusion of uncertainty. Experimental studies and anecdotal evidence from existing permit markets suggest that this is probably not a major problem – at least for domestic programs. On the international level, things may look different. As regards carbon trading, a particularly important danger seems to be that Russia and the Ukraine exert market power. In a first attempt to estimate the costs of such a situation, Burniaux (1999) finds that by 2010 the price of Assigned Amount Units (the term for emission permits that the Kyoto protocol uses) would be about 20 per cent higher than under the competitive scenario (for a discussion see OECD (2001)). Clearly, the best way to avoid such situations is for governments to devolve their assigned amounts to their legal entities and promote industry-level trading (Bader 1996; Hahn 1984b).

Market efficiency, transaction costs

If we want to rely on environmental markets to give us efficient results, we must be able to rely on them in providing informational or market efficiency first. One key to a smooth functioning of the tradable permit market is a low level of transaction costs.

Three potential sources of transaction costs in tradable permit markets can be identified: (1) search and information; (2) bargaining and decision (Dwyer 1992; Kohn 1991); and (3) monitoring and enforcement. Anecdotal evidence abounds regarding the prevalence of significant transaction costs in tradable permit markets. Atkinson and Tietenberg (1991) surveyed six empirical studies that found trading levels in permit markets to be lower than anticipated by theoretical models. On the other hand, it has been recognized that success stories like the EPA's leaded gasoline phasedown can partially be attributed to the program's minimal administrative requirements and the fact that the potential trading partners (refineries) were already experienced at striking deals with one another.[6] Transaction costs in the SO_2 market in the US – the most successful TP market – are now minimal. The lesson for policymakers is to make administrative procedures as simple as possible and to equip potential trading partners with means to efficiently communicate market-relevant information with each other.[7]

A final word is in order on the international realm. When governments themselves trade, transactions could be the result of bilateral bargaining where emission permits are not the only element of the transaction; in other words, governments will in general be motivated by other factors than strict economic ones. Prior notification by parties and, more generally, the establishment of specific exchanges has been advocated to promote competitive behavior (Bohm 1998). First experiments (Hizen and Saijo 1999) seem to indicate, however, that disclosure of contract information does generally not improve market efficiency. Similarly, trading through an exchange does not seem to improve significantly the efficiency of the trading regime as opposed to bilateral trading. These results are surprising and merit further investigation.

Enforcement and management framework

There are two aspects to an enforcement framework: One is the monitoring of compliance with the regulatory framework and detecting violations. The other is responding to violations in a way that ensures that it is always in the interests of participants to comply. Often, the first aspect is the simpler of the two. For example, for CO_2, since it is a mostly uniformly mixed pollutant, we do not have to monitor each and every source of CO_2 emissions, but can focus on the sales of the major distributors of carbon-based fuels. In fact, just from such sources, estimates of the consumption of various carbon-based fuels in each country are already available from data on production, import, export, and inventories.[8]

The enforcement poses much more serious problems, in particular in the international context. Malik (1990) demonstrates that with imperfect compliance, firms set the level of emissions such that marginal profits equal the permit price plus the expected fine. It can also be shown that if the marginal penalty of noncompliance is constant, tradable emission permits lead to less noncompliance than does regulation. With increasing margin-

[6] For an overview of quantitative empirical estimates across various programs, we refer the reader to Wagner and Schneider (2003)
[7] Not only the level of transaction costs is important. Stavins (1995) shows that when transaction costs are dependent on the volume traded, this may imply that the final equilibrium, and hence cost efficiency, is no longer independent of the initial distribution of permits (the precise result depends on the exact shape of transaction costs)..
[8] It should be noted that if the lives of quotas are not synchronized – if they specify a total of emissions over a multiyear life – matters could be more difficult.

al penalties (as a function of the violation), all firms will comply if the permit price below the expected per unit violation penalty. With decreasing marginal penalties, firms that decide not to comply will pollute more than under regulation. In sum, with imperfect enforcement, whether or not tradable permits meet the environmental goal depends on the structure of the penalty function.

With respect to market management more generally, the clear recommendation from economic theory is to allow market participants to fully exploit cost-saving opportunities and risk-management possibilities, for example through the use of derivatives (as they are already traded in the SO_2 and NO_x allowance markets in the US). In addition to facilitating heding price risks, derivatives also help achieve market depth and liquididy and so improve market functioning.

Interaction between international and domestic policies and needs

Sometimes it is argued that it does not matter how countries enforce given total emission levels domestically, as long as the allocation of quotas among countries is clear "...in principle, any domestic policy regime is possible." (Chichilnisky and Heal 2000). Hahn and Stavins (1999) deal critically with this important point, which has received surprisingly little attention in the literature on international environmental agreements.

They start from the observation that the Kyoto Protocol's greenhouse gas trading mechanism will lead to minimized costs if all countries use domestic tradable permit systems to meet their national targets and allow for international trades. Thus, the European Union's proposal to introduce a trading system within Europe to fulfull the requirements of Kyoto, indeed is very important for the overall performance of Kyoto's system. By contrast, political practice suggests that many countries will use non-trading approaches such as greenhouse-gas taxes or fixed quantity standards. Hahn and Stavins show that in these cases, achieving the potential cost savings of international trading requires some form of project-by-project credit program – like joint implementation. However, large transaction costs, likely government participation, and absence of a well-functioning market may be obstacles for this toute. Overall, there is an important trade-off between the degree of domestic sovereignty and the degree of cost-effectiveness.

A related question is how to link existing schemes, for example the Danish and the UK CO_2 schemes (Bode 2002). Again, as long as the abatement costs in separated trading schemes are different, the linkage of two schemes can result in increased overall cost-effectiveness. There will be equity considerations, however, since prices will change compared to the previous equilibrium. This may raise resistance by the loosing participants in advance of the linking of schemes. Bode (2002) discusses in detail how the linkage of schemes and differences in design features like those discussed in the present paper interact with each other. Obviously, there are also often difficult legal issues involved (Rodi 2002).

Summary

Tradable permit programs have been in use in the United States for a long time and are also on their way to becoming a very popular environmental policy instrument in Europe. This guide has aimed to highlight ten of the most important issues in designing a successful tradable permit program.

1. The choice of trading of emissions versus trading of inputs (e.g. CO_2 trading versus carbon content trading) depends on the degree to which the pollutant is uniformly mixed.
2. In most instances, mandatory schemes will be more cost-effective. They avoid adverse selection problems in participation.
3. Many arguments speak for the use of absolute baselines in national programs. We have also pointed out, however, that the concept of targeting a decline in CO_2 emissions intensity in the economy may have some merit.
4. The clear economic advice is to auction off permits instead of grandfathering them. Of course, political feasibility considerations will often make this impossible.
5. Initial allocations may be important for efficiency when there is a high degree of inequality in wealth between the trading entities, for example, in the international context.
6. Temporal flexibility should be allowed to as large extent as environmental effectiveness allows it.
7. The market management authority needs to be careful to avoid anti-competitive behavior on the market, although existing studies seem to indicate that strategic behavior on tradable

permit markets is not an important phenomenon.

8. Participating firms and other entities must have the ability to quickly communicate in order to keep transactions costs low.
9. Continual monitoring of compliance and enforcement of the "rules of the game" of a tradable permit program are essential ingredients in reducing uncertainty for market participants and to secure environmental effectiveness.
10. The design of national emissions programs in the presence of international agreements is difficult. Linking existing schemes inevitably produces losers who may need to be compensated.

References

Abel, Andrew B., Avinash K. Dixit, Janice C. Eberly, and Robert S. Pindyck. 1995. Options, the value of capital, and investment. Quarterly Journal of Economics 111 (3): 753–777.

Ackermann, Bruce A., and Richard B. Stewart. 1985. Reforming Environmental Law. Stanford Law Review 37: 1333–1346.

Arrow, Kenneth J., and Anthony C. Fisher. 1974. Environmental Preservation, Uncertainty, and Irreversibility. Quarterly Journal of Economics 88: 312–319.

Atkeson, E. 1997. Joint implementation: Lessons from the Title IV's Voluntary Compliance Programs. Cambridge, MA: MIT CEEPR Working Paper 97003.

Atkinson, S., and T. Tietenberg. 1991. Market Failure in Incentive-Based Regulation: The Case of Emissions Trading. Journal of Environmental Economics and Management 21: 17–31.

Bader, P. 1996. Emissions trading: country-model vs. industry-model. Augsburg: University of Augsburg.

Bode, Sven. 2002. Emission trading schemes in Europe: national programmes. Hamburg: Hamburg Institue of International Economics.

Bohm, P. 1998. Determinants of the benefits of international carbon emissions trading: theory and experimental evidence. In Emissions Trading – Proceedings of the Conferences on Greenhouse Gas Emissions Trading, edited by ABARE. Canberra: ABARE.

Burniaux, J.-M. 1999. How important is market power in achieving Kyoto? An assessment based on the GREEN model. Paris: Economics Directorate.

Chao, Hung-Po. 1995. Managing the Risk of Global Climate Catastrophe: An Uncertainty Analysis. Risk Analysis 15: 69–78.

Chichilnisky, Graciela, and Geoffrey Heal. 1993. Global Environmental Risks. Journal of Economic Perspectives (Fall): 65–86.

Chichilnisky, Graciela, and Geoffrey Heal. 1994. Who Should Abate Carbon Emissions? An International Viewpoint. Economics Letters 44 (Spring): 443–449.

Chichilnisky, Graciela, and Geoffrey Heal. 2000. Markets for Tradable Carbon Dioxide Emission Quotas: Principles and Practice. In Environmental Markets, edited by G. Chichilnisky and G. Heal. New York: Columbia University Press.

Dewees, Donald N. 1983. Instrument Choice in Environmental Policy. Economic Inquiry 21: 53–68.

Dixit, Avinash, and Robert S. Pindyck. 1998. Expandability, reversibility, and optimal capacity choice. Cambridge, MA: NBER Working Paper 6373.

Dwyer, J. P. 1992. A Free Market in Tradable Emissions Is Slow Growing. Public Affairs Reporter 1 (January): 6–7.

Ellerman, A. Denny. 2002. U.S. Experience with emissions trading: Lessons for CO2 emissions trading. Cambridge, MA: MIT.

Ellerman, A. Denny, and Juan-Pablo Montero. 2002. The temporal efficiency of SO2 Emissions Trading. Cambridge, MA: Center for Energy and Environmental Policy Research (CEEPR) and Catholic University of Chile.

Goulder, Lawrence H., and Lans Bovenberg. 1996. Revenue-Raising vs. other approaches to environmental protection: The critical significance of pre-existing tax distortions. Cambridge, MA: NBER Working Paper 5641.

Hahn, Ronald W. 1984a. Market power and transferable property rights. Quarterly Journal of Economics 99 (4): 735–765.

Hahn, Robert W. 1984b. Market power and transferable property rights. The Quarterly Journal of Economics 99: 753–765.

Hahn, Robert W., and Robert N. Stavins. 1999. What has Kyoto Wrought? The Real Architecture of International Tradable Permit Markets. Cambridge, MA: Harvard University.

Hassett, Kevin, and Gilbert E. Metcalf. 1994. Investment with uncertain tax policy: Does random tax policy discourage investment? Cambridge, MA: NBER Working Paper No. 4780.

Hizen, Y., and T. Saijo. 1999. Designing GHG Emission Trading Institutions in the Kyoto Protocol: An Experimental Approach. Environmental Modelling & Software forthcoming.

Joskow, Paul L., Richard Schmalensee, and Elisabeth Bailey. 1996. Auction design and the market for sulfur dioxide emissions. Cambridge, MA: NBER Working Paper No. 5745.

Klaassen, Ger. 1996. Acid rain and environmental degradation: the economics of emission trading. Edited by IIASA, New Horizons in Environmental Economics. Cheltenham: Edward Elgar.

Klaassen, Ger, and A. Nentjes. 1997. Creating Markets for AIr Pollution control in Europe and the USA. Environmental and Resource Economics 10: 125–146.

Kohn, R. E. 1991. Transactions Costs and the Optimal Instrument and Intensity of Air Pollution Control. Policy Science 24: 315–332.

Kolstad, Charles D. 1992. Regulating a Stock Externality Under Uncertainty with Learning. Urbana-Champaign: University of Illinois.

Kolstad, Charles D. 2002. Climate Change Policy: A View from the US. Cambrdige, MA: MIT.

Malik, A. 1990. Markets for pollution control when firms are non-compliant. Journal of Environmental Economics and Management 18: 97–106.

Misiolek, W., and H. Elder. 1989. Exclusionary maniplation of markets for pollution rights. Journal of Environmental Economics and Management 16: 156–166.

Montero, Juan-Pablo. 1999. Voluntary Compliance with Market-Based Environmental Policy. Journal of Political Economy 107: 998–1033.

Montgomery, W. David. 1972. Markets in Licenses and Efficient Pollution Control Programs. Journal of Economic Theory 3 (3): 395–418.

Nichols, A., J. Farr, and G. Hester. 1996. Trading and the Timing of Emissions: Evidence from the Ozone Transport Region. Cambridge, MA: National Economic Research Associates.

OECD. 2001. Market Power and Market Access in International GHG Emissions Trading. Paris: Environment Directorate.

Pindyck, Robert. 2000. Irreversibilities and the Timing of Environmental Policy. Resource and Energy Economics 22 (July): 233–259.

Rodi, Michael. 2002. Legal Aspects of the EU Proposal on Emissions Trading.

Schaerer, B. 1994. Economic Incentives in Air Pollution Control: The Case of Germany. European Environment 4 (3): 3–8.

Schneider, Friedrich, and Alexander F. Wagner. 2002. COP-7: What happened in Marrakech? Linz and Cambridge, MA: University of Linz and Harvard University.

Sorrell, S. 1999. Why sulphur trading failed in the UK. In Pollution for Sale: Emissions Trading and Joint Implementation, edited by S. Sorrell and J. Skead. Cheltenham: Edward Elgar.

Stavins, Robert N. 1995. Transaction Costs and Tradable Permits. Jorunal of Environmental Economics and Management 29: 133–148.

Stavins, Robert N. 1998. What Can We Learn from the Grand Policy Experiment? Lessons from SO2 Allowance Trading. Journal of Economic Perspectives 12 (3): 69–88.

Stavins, Robert N. 2002. Experience with Market-Based Environmental Policy Instruments. In The Handbook of Environmental Economics, edited by K.-G. M. a. J. Vincent. Amsterdam: North-Holland.

Wagner, Alexander F., and Friedrich Schneider. 2003. Tradable Permits and Climate Change Policy: A survey. Linz and Cambridge, MA: University of Linz and Harvard University.

Appendix

Table A1:
Instruments of environmental policy and criteria to evaluate them

Dimension	Instrument Emission Charges	Tradeable permits	Regulation
Cost efficiency	+	+	–
Environmental effectiveness	–	+	+
Administrative practicability	+	+	+
Dynamic efficiency	+	+	0
Political acceptability	0	0/+	+
"+" = high, "–" = low, "0" = neutral.			

Source: Klaassen (1996), Wagner and Schneider (2003).

Table A2:
Conditions affecting cost efficiency and environmental effectiveness

	Cost efficiency			Environmental effectiveness		
	Charges	Permits	Regulation	Charges	Permits	Regulation
Uncertainty about costs	–	0	–	–	0	?
Imperfect markets	–	–	?	–	0	?
Transaction costs	0	–	0	0	0	0
Imperfect enforcement	0	–	?	0/–	–	–
Discontinuous control	0	0	–	–	0	0
Cost-saving techn. Progress	–	0	?	?	0	0
Economic growth	0	0	0	–	0	–
Inflation	0	0	0	–	0	0
"-" = negative impact; "0" = no impact; "?" = unknown.						

Source: Klaassen (1996), Wagner and Schneider (2003).

Tradable Permits with Imperfect Monitoring

Juan-Pablo Montero*

Introduction

In recent years environmental policy makers have been paying more attention to tradable permits (or emissions trading) as an alternative to the traditional command-and-control (CAC) approach of setting emission and technology standards. A notable example is the 1990 U.S. Acid Rain program that implemented a nationwide market for electric utilities' sulfur dioxide (SO_2) emissions (Schmalensee et al., 1998; Ellerman et al., 2000). In order to have a precise estimate of the SO_2 emissions that are going to the atmosphere, the Acid Rain program requires each affected electric utility unit to install costly equipment that can continuously monitor emissions. Another example with similar monitoring requirements is the Southern California RECLAIM program that implemented separated markets for nitrogen oxide (NO_x) and SO_2 emissions from power plants, refineries and other large stationary sources.[1]

These and other market experiences suggest that conventional tradable permits programs are likely to be implemented in those cases where emissions can be closely monitored, which almost exclusively occurs in large stationary sources like electric power plants and refineries. At least this is consistent with the evidence that environmental authorities continue relying on CAC instruments to regulate emissions from smaller sources for which continuous monitoring is prohibitively costly (or technically unfeasible). Although CAC regulation for smaller sources does not directly target emissions either (the regulated source must install some required abatement technology or set its emissions per unit of output equal or lower than a certain emissions standard), some regulators believe that a permits program in which emissions are not closely monitored may result in even higher emissions than under an alternative CAC regulation because permits provide firms with more flexibility to choose output and emissions.

Thus, it appears at first that permits markets are not suitable for effectively reducing air pollution in cities such as Santiago-Chile or Mexico City where emissions come from many small (stationary and mobile) sources rather than a few large stationary sources. It would be prohibitively costly, for example, to require operators of central heating systems in residential or commercial buildings to install continuous emission monitoring equipment. Through annual inspections, however, the regulator could monitor boilers' combustion technology, fuel type, emissions rate and size, as he would precisely do under CAC regulation. But since the regulator does not observe the total number of hours boilers are operated during the year, he would certainly have imperfect estimates of boilers' actual emissions.

May tradable permits be used to reduce air pollution in big cities?

Rather than disregard tradable permits markets as a policy tool, I think the challenge faced by policy makers in cities suffering similar air quality problems is to find out when and how to implement these markets using approximate monitoring procedures similar to those under CAC regulation. While the literature provides little guidance on how to approach this challenge, it is interesting to observe that despite its incomplete information on each source's actual emissions, Santiago-Chile's environmental agency has already implemented a tradable permits market to control total suspended particulate (TSP) emissions from a group of about 600 stationary sources (Montero et al., 2002). Based on estimates from annual inspection for technology parameters such as source's size and fuel type, the regulator approximates each source's

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[1] It is worth noting that RECLAIM did not include a market for volatile organic compounds (VOC) in large part because of the difficulties with monitoring actual emissions from smaller and heterogeneous sources (Harrison, 1999).

actual emissions by the maximum amount of emissions that the source could potentially emit in a given year.

Motivated by Santiago's emissions trading experiment, in a recent paper I provide a theoretical and empirical evaluation of the advantages of tradable permits over CAC regulation under imperfect monitoring (Montero, 2003). The purpose of this note is to communicate the main results and policy implications of this study.

Some theory

A model to evalute the effects of tradable permits vs. CAC regulations under imperfect monitoring

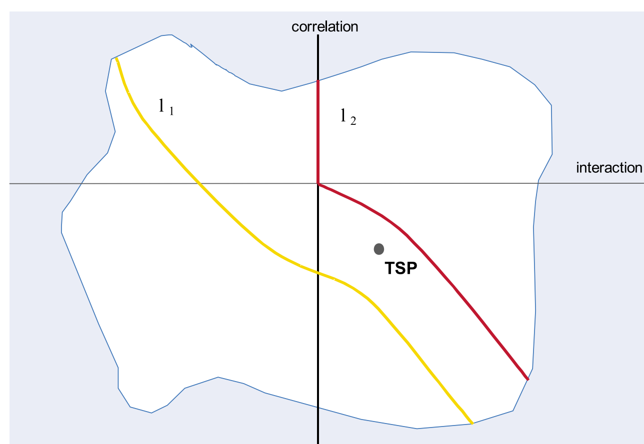
It is well known that, when emissions can be closely monitored, a tradable permits program can provide important cost savings over an alternative CAC regulation (Tietenberg, 1985). It is not clear, however, whether permits can still provide an important welfare advantage when emissions are imperfectly monitored. To answer this question I develop a theoretical model and I compare social welfare under the two (optimally designed) policies: technology (or emission rate) standard and tradable permits. Since the regulator is assumed to observe only the firm's abatement technology or emission rate but not its actual emissions, in order to implement the permits policy the regulator must use some proxy for emissions. For example, as in Santiago's trading program, he could proxy emissions by the emissions that the source would emit if it operated its production facilities without interruption throughout the year (sources in Santiago's program operate, on average, less than half of the time).[2]

The theoretical model provides important results that can be tested with the data. In fact, I find that permits policy provide firms not only with flexibility to choose production and abatement possibilities (the cost savings effect) but sometimes with incentives to choose socially suboptimal combinations of output and abatement; something that would not occur if emissions were accurately measured. The misalignment between private and social incentives occurs because the regulator neither observes emissions nor hours of operation (or output), so the permits policy can prompt changes in output that can lead to higher emissions. There are two cases in which the incentives misalignment can happen. The first case is when firms with relatively large output ex-ante (i.e., before the regulation) are choosing low abatement (i.e., when there is a negative correlation between production and abatement costs). The second case is when firms doing little abatement find it optimal to increase output ex-post (i.e., when there is a negative interaction between output and abatement).

While the cost savings effect is always positive (i.e., the permits policy is always cheaper than the standards policy), the correlation and interaction effects can be either positive or negative. When either one or both of these latter two effects are negative, the superiority of the permits policy over the standards policy is no longer evident. The size and sign of these three effects is an empirical matter that will ultimately depend on the cost structure of the specific industry (or group of sources) that is going to be regulated. Generated from simple but reasonable parameter values, the Figure provides an illustration of how the correlation and interaction effects affect the relative advantage of permits over standards. The permits policy is welfare superior for all those combinations to the right of line l_1. When there are no correlation and interaction effects the permits policy is unambiguously superior to the standards policy.

Because in deciding whether to use permits or standards, the regulator is likely to face a trade-off

INTERACTION AND CORRELATION EFFECTS



[2] It is important to explain that using as a proxy half of the maximum emissions would work equally well because the regulator would then adjust (i.e., increase) the number of permits accordingly. See Montero (2003) for more details.

between cost savings and possible higher emissions, it seems relevant to discuss the advantages of implementing a hybrid policy in which permits are combined with some (optimally chosen) standard. While the hybrid policy should not be inferior to either single instrument policy, I find that in many situations the hybrid policy converges to the permits-alone policy but it almost never converges to the standards-alone policy. In fact, for all those cost structures in which the correlation and interaction effects fall to the right of line l_2 in the Figure, the hybrid policy converges to the permits-alone policy, i.e., the inclusion of a binding standard would decrease welfare.

Some empirical evidence

The theoretical results indicate that whether the permits policy provides higher welfare than a standards policy is an empirical question. I use the experience from Santiago's total suspended particulate emissions (TSP) trading program to answer this question. The TSP trading program, established in March of 1992 and effective since 1994, was designed to curb TSP emissions from the largest stationary sources in Santiago (industrial boilers, industrial ovens, and large residential and commercial heaters). Because sources were too small to require sophisticated monitoring procedures, the authority did not design the program based on sources' actual emissions but on a proxy variable equal to the maximum emissions that a source could emit in a given period of time if it operated without interruption.

The proxy variable (expressed in kg of TSP per day) used by the authority in this particular program was defined as the product of emissions concentration (in mg/m^3) and flow rate (in m^3/hrs) of the gas exiting the source's stack. Although the regulatory authority monitors each affected source's concentration and flow rate once a year, emissions and permits are expressed in daily terms to be compatible with the daily TSP air quality standards. Thus, a source that holds one permit has the right to emit a maximum of 1 kg of TSP per day indefinitely over the lifetime of the program.

Sources registered and operating by March 1992 were designated as existing sources and received grandfathered permits equal to the product of an emissions rate of 56 mg/m^3 and their maximum flow rate at the moment of registration. New sources, on the other hand, receive no permits, so must cover all their emissions with permits bought from existing sources. The total number of permits distributed (i.e. the emissions cap) was 64 percent of aggregate emissions from existing sources prior to the program. After each annual inspection, the authority proceeds to reconcile the estimated quasi-emissions with the number of permits held by each source (all permits are traded at a 1:1 ratio). Note that although permits are expressed in daily terms, the monitoring frequency restricts sources to trade permits only on an annual or permanent basis.

Because firms are not required to provide the regulator with information on production and abatement costs, to empirically recover the cost structure of the industry and test the advantages of the TSP program I apply the theoretical framework to information other than cost such as emission rates and utilization (hours of operation). The Table presents a summary of the data used in the empirical study for selected years. The first two rows show that the exit and entry of sources has been quite significant. By 1999, 36 percent of the affected sources were new sources despite the fact that they did not receive any permits.

The model is applied to emission rates and utilization

In order to comply with the TSP trading program, affected sources can hold permits, reduce emissions or do both. They can reduce emissions by either switching fuel (for example, from wood, coal, or heavy oil to light oil, liquid gas, or natural gas) or installing end-of-pipe technology such as filters, electrostatic precipitators, cyclones, and scrubbers. Sources do not gain anything, in terms of emissions reduction, by changing their utilization level (i.e. days and hours of operation), because by definition it is assumed to be at 100 percent.

The next rows of the Table show data on emission rates and utilization. The large standard deviations show that these variables vary widely across sources in all years. As the 1993 numbers indicate, sources' utilization was quite heterogeneous before the implementation of the program, indicating some potential for higher emissions under a permits policy. The Table also indicates that the emissions rates of affected sources has remained quite different across sources after the program became effective. This compliance heterogeneity

Summary statistics for affected sources in selected years

Variable	1993	1995	1997	1999
No. of sources				
Existing	635	578	430	365
New	45	112	146	208
Total affected	680	690	576	573
Emission rate (mg/m^3)				
Average	94.9	83.1	54.7	27.8
Standard dev.	88.1	77.8	43.0	18.5
Max.	702.0	698.2	330.7	108.2
Min.	1.5	1.5	3.6	4.6
Utilization (%)				
Average	39.4	48.0	49.2	53.7
Standard dev.	30.3	31.5	31.8	32.3
Max.	100	100	100	100
Min.	0	0	0	0
Total emissions (kg/day)	7,051.9	6,320.9	3,535.0	1,665.0
Total permits (kg/day)	4,604.1	4,604.1	4,087.5	4,087.5

Notes: A utilization of 100 percent corresponds to 24 hrs of operation during 365 days. Utilization figures are based on most but not all sources. Information on utilization is not required for monitoring and enforcement purposes.

Capturing the cost structure: permits are superior to regulation

confirms that, contrary to what occurs under CAC regulation where all firms must either install the same abatement technology or comply with the same emission rate, permits provide enough flexibility for sources to comply in very different ways.

The last two rows of the Table show data on emissions and permits.[3] Although 1994 was in principle the first year of compliance with the program, trading activity did not occur until the end of 1996 because of evident enforcement problems. The emissions goal of the TSP program was only achieved by 1997 (total emissions below total permits). This was the year after which natural gas became available from Argentina at unexpectedly attractive prices so that many affected sources switched to this cleaner fuel leaving the cap of 4,087.5 permits largely unbinding. This is consistent with the fact that all TSP trading activity took place from the end of 1996 to the middle of 1998 with prices steadily declining from 17,000 to 3,000 US$/permit.[4] For these reasons, most of the empirical analysis is based on the 1997 data.

Using the data summarized in the Table, I then proceed to capture the cost structure of the group of sources affected by the TSP program. Econometric estimations indicate that while the interaction effect is positive (i.e. firms doing more abatement are also increasing output relative to sources doing less abatement), the correlation effect is negative (i.e. sources more heavily utilized are doing less abatement). These two effects almost offset each other. I find only a mild increase in emissions, if any, compared to what would have been observed under an equivalent standards policy. Furthermore, because cost savings are found to be substantial (explained by the significant heterogeneity in emission rates shown in the Table), the permits policy is found to be superior.

In terms of the Figure, the dot "TSP" provides a good illustration of the cost structure of the sources affected by the TSP program, which suggests some potential gains from implementing a hybrid policy. Preliminary estimates based on the 1997 data indicate that the combination of a slightly larger fraction of permits with an optimally chosen standard could add some extra 10 percent of benefits.

Conclusions

When emissions cannot be closely monitored, the environmental regulator will inevitably face a tradeoff between abatement flexibility and output and abatement misallocation in deciding whether or not to implement a permits policy instead of a traditional standards policy. Because these misallocations can lead to higher emissions, I do find situations in which a standards policy can be welfare superior. However, when I used emissions and output data from Santiago's TSP emissions trading program to test for this possibility I found no evidence. Conversely, I found conclusive evidence that the production and abatement cost characteristics of the sources affected by the TSP program are such that the permits policy is unambiguously welfare superior because not only does it lead to significant cost savings but also to virtually the same aggregate emissions than under an equivalent standards policy.

[3] A few permits were retired from the market in 1997 as the authority revised the eligibility of some sources for receiving permits (Montero et al., 2002).
[4] Obviously, intra-firm trading has continued as new sources are coming into operation.

The superiority of the permits policy is due in large part to the fact that sources making larger emission reductions are also increasing their utilization relative to other sources. This behavior seems to be more general than one may think. Firms choosing abatement investments with proportionally large fixed/sunk costs (e.g., installing end-of-pipe technologies) not only make larger reductions but also enjoy lower ex-post marginal abatement costs (ex-ante marginal abatement costs should be similar at the margin), so their ex-post marginal production cost is relatively lower, and hence, their utilization relatively higher.[5]

In conclusion, the theoretical and empirical results discussed here make a strong case for the wider use of environmental markets even in those situations in which emissions are imperfectly observed. In the particular case of Santiago, these results suggest that using simple monitoring procedures it is possible and economically sound to expand the TSP trading program (which now is responsible for less than 5 percent of TSP emissions in Santiago) to other sources that are currently not regulated or subject to costly CAC regulation such as smaller stationary sources and industrial processes (both responsible for 27.0 percent of TSP in 2000), power diesel buses (36.7 percent), trucks (24.7 percent) and smaller commercial vehicles and cars (6.8 percent). A similar approach can also be used for regulated other pollutants such as NO_x.

References

Ellerman, A.D, P. Joskow, R. Schmalensee, J.-P. Montero and E.M. Bailey (2000), *Markets for Clean Air: The U.S. Acid Rain Program,* Cambridge University Press, Cambridge, UK.

Harrison, David Jr. (1999), “Turning theory into practice for emissions trading in the Los Angeles air basin,” in Steve Sorrell and Jim Skea (eds), *Pollution for Sale: Emissions Trading and Joint Implementation,* Edward Elgar, Cheltenham, UK.

Montero, J.-P., J.M. Sánchez, R. Katz (2002), “A market-based environmental policy experiment in Chile,” *Journal of Law and Economics* 45, 267–287.

Montero, J.-P. (2003), “Trading quasi-emissions permits,” Catholic University of Chile, mimeo.

Schmalensee, R, P. Joskow, D. Ellerman, J.-P. Montero, and E. Bailey (1998), “An interim evaluation of sulfur dioxide emissions trading,” *Journal of Economic Perspectives* 12, 53–68.

Tietenberg, T. (1985), *Emissions Trading: An Exercise in Reforming Pollution Policy,* Resources for the Future, Washington, DC.

[5] The SO_2 trading system of the 1990 US acid rain program provides strong evidence on this as well. Affected sources retrofitted with scrubbers (end-of-pipe technologies that can reduce up to 95 percent of the emissions coming out of the stack) experienced a noticeably increase in utilization relative to affected sources that switched to lower sulfur coals or simply did not abate emissions (Ellerman et al., 2000, pp. 334–341).

EMISSIONS TRADING WITH GREENHOUSE GASES IN THE EUROPEAN UNION

JOHANN WACKERBAUER*

In the 1997 Kyoto Protocol, 38 developed countries (plus the EU) accepted legally binding reductions of greenhouse gas emissions of at least 5 percent over the period 1990 to 2008–12. The European Union has committed itself to an even higher reduction of 8 percent within this time framework. To provide flexibility, the Kyoto Protocol permits the transfer or exchange of emissions reductions among the signatory countries via so-called flexible mechanisms. Industrialised countries may transfer or acquire from each other emission reductions on a project basis through Joint Implementation (JI). The Clean Development Mechanism (CDM) allows emissions credits to be obtained from projects undertaken in developing countries. Finally, the Kyoto Protocol marks the creation of an international emissions trading (IET) system among the signatory states (Galeotti et al. 2001). Furthermore, the Kyoto Protocol allows a group of countries to have an aggregate target by setting up a bubble. The countries of the European Union did this in their burden-sharing agreement, the EU Bubble being the first of its kind. Because of this common commitment, emissions trading between the members of the European Union and between entities within those countries is regarded as "domestic action" (Egenhofer 2001).

The EU will allow CO_2 emissions trading at industry level from 2005

In March 2000, the European Commission adopted a Green Paper on greenhouse gas emissions trading within the EU and launched a debate on the introduction of this market-based instrument. In October 2001, the Commission submitted a proposal for an EU greenhouse gas emissions trading system. In December 2002, the Council unanimously reached political agreement on a common position on the Commission's proposal. The proposal covers greenhouse gas emissions trading for the European Union at industry level which is in contrast to the Kyoto Protocol, which allows international emissions trading only at the state level. According to the EU scheme, the total quantity of greenhouse gas emissions will be limited and installations will be able to engage in Community-wide emissions trading. All installations covered by the scheme will have to apply for a greenhouse gas "permit" that requires adequate monitoring and reporting of emissions. Furthermore, to emit a certain quantity of greenhouse gases, operators must possess corresponding greenhouse gas "allowances", denominated in metric tonnes of carbon dioxide equivalent. The allowances will be transferable and may be traded between companies. The first trading period will be from 2005 to 2007, preceding the Kyoto Protocol's commitment period. In this first phase, only CO_2 emissions will be covered by the scheme. The next trading period will coincide with the Kyoto Protocol's commitment period of 2008 to 2012. Member states will allocate allowances in each trading period such that total emissions are not higher than if they were regulated by the IPPC Guideline (EU Commission 2001). The scheme will be applied to most of the significant greenhouse gas emitting activities that are already covered by the IPPC Directive as well as some installations not covered (see Table). According to the Commission, some 4,000 to 5,000 installations will be regulated by the Directive covering approximately 46 percent of estimated EU carbon dioxide emissions in 2010. The chemical sector is excluded because its direct emissions of carbon dioxide are less than one percent of the EU's total emissions, and the number of chemical installations in the Community, in the order of 34,000 plants, will increase the administrative complexity of the scheme. The waste incineration sector is excluded due to problems of measuring the carbon content of the waste material that is being burnt. However, carbon dioxide emissions from any on-site power and heat generating facility will be included if it exceeds the threshold of 20 MW.

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Activities covered by the Commission's proposal

<u>Energy activities</u>
- ⇨ Combustion installations with a rated thermal input exceeding 20 MW (excepted: hazardous or municipal waste installations)
- ⇨ Mineral oil refineries
- ⇨ Coke ovens

<u>Production and processing of ferrous metals</u>
- ⇨ Metal ore (including sulphide ore) roasting or sintering installations
- ⇨ Installations for the production of pig iron or steele (primary or secondary fusion) including continuous casting, with a capacity exceeding 2.5 tonnes per hour

<u>Mineral industry</u>
- ⇨ Installations for the production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or lime in rotary kilns with a production capacity exceeding 50 tonnes per day or in other furnaces with a production capacity exceeding 50 tonnes per day
- ⇨ Installations for the manufacture of glass including glass fibre with a melting capacity exceeding 20 tones per day
- ⇨ Installations for the manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain, with a productions capacity exceeding 75 tonnes per day, and/or with a kiln capacity exceeding 4 m^3 and with a setting density per kiln exceeding 300 kg/m^3

<u>Other activities</u>
- ⇨ Industrial plants for the production of
  - (a) pulp from timber or other fibrous materials
  - (b) paper and board with a production capacity exceeding 20 tonnes per day

Source: Commission of the European Communities, COM(2001)581, Annex 1.

The compatibility of emissions trading with traditional environmental instruments

Theoretical considerations suggest that emissions trading has considerable economic advantages over the use of other instruments to combat greenhouse gas emissions and meet the Kyoto target. Evidence also suggests that the more widely emissions trading is applied, the higher the economic benefits. This contrasts with the actual situation of environmental policy resting on "traditional" instruments, i.e. regulation, voluntary agreements, and taxation.

In principle, there are two categories of environmental policy instruments serving the control of greenhouse gas emissions: Direct regulation, also referred to as command-and-control instruments, on the one hand, and instruments providing incentives for climate-friendly behaviour, also referred to as market-based instruments, on the other. Standards on specific emissions or energy efficiency are examples of the first category, taxes and subsidies, but also tradable permits belong to the second category. With respect to climate change policy, voluntary agreements and project-based instruments have to be added to this list. Voluntary agreements are not easy to classify: Insofar as they imply a commitment to the reduction of greenhouse gas emissions, they resemble a regulatory instrument. Insofar as financial incentives are given to individual firms for joining the voluntary agreement, they approach market-based instruments. In fact, they cannot be clearly assigned to one of the two categories but rather resemble a corporatistic approach (Remings et al. 1996). Last, but not least, project-based instruments are new investments in technical projects that have environmental advantages. Being voluntary, they cannot be regarded as command-and-control instruments; because of existing incentives for minimising the cost of reducing emissions, they are more or less market-based.

Market-based instruments are superior to command-and-control instruments

Economic theory shows that market-based instruments are superior to command-and-control instruments because they minimise the costs of emission abatement by leaving it up to the plant operator whether to apply expensive technologies or to opt for paying fees or buying tradable permits. Technical standards tend to increase costs because they may impose high expenditures on single firms for complying with the regulation. In contrast to taxes and subsidies, an emissions trading scheme provides certainty of the environmental outcome if a cap is imposed on total emissions.

For a long time, environmental policy has relied on command-and-control instruments and on subsidies for environmentally friendly behaviour. In recent years, some countries have introduced eco(logy)-taxes. Denmark, Norway, Sweden and the Netherlands introduced CO_2 taxes; Belgium, Finland and Germany imposed additional energy taxes to encourage emission abatement (Osterkamp 2001). Voluntary agreements were part of pre-Kyoto climate change policy in Finland (energy conservation agreements), the Netherlands (long-term energy efficiency agreements), Sweden (eco-energy programme), France (agreements on CO_2 reduction and energy efficiency), Denmark (CO_2 emission abatement), the United Kingdom (agreement on energy efficiency improvement) and Germany (declaration by German Industry on global warming). Since the Kyoto Protocol (December 1997), new commitments have been agreed

in Switzerland (Action Programme Energy 2000) and in Italy (climate pact between government, industry and NGOs). The UK introduced a Climate Change Levy (CCL) that defines a group of voluntary commitments as complementary measures and Germany amended the declaration on global warming. On the level of the European Union, the Commission and the automotive industry agreed on the reduction of specific CO_2 emissions of new cars (Jones et al. 2001). With respect to these manifold instruments adopted for the reduction of greenhouse gas emissions, including standards, taxes, voluntary agreements and emissions trading, attention must be paid to the extent to which they overlap and whether conflicts between them are to be expected.

Emissions trading and command-and-control instruments

In order to combine command-and-control instruments and emissions trading the IPPC rules will have to be modified

The IPPC Directive on integrated pollution and prevention control[1] is the backbone of the regulations regarding stationary pollutants in the European Union. It requires that installations be operated in such a way that all appropriate preventive measures are taken against pollution, in particular the application of the best available techniques (BAT) and the efficient use of energy (Rehbinder and Schmalholz 2002). In principle, both technology standards and energy efficiency standards are incompatible with emissions trading because they do not allow the operator of an installation to choose between applying the BAT or buying tradable permits. However, the IPPC Directive does not yet cover any of the six greenhouse gases. Methane (CH_4), dinitrogen monoxide (N_2O), hydrofluorocarbons (HFC), perfluorinated hydrocarbons (PFC) and sulphur hexafluoride (SF_6) are listed as harmful substances in Annex 3 of the IPPC guideline, but there are no emission standards imposed on them. Carbon dioxide is only implicitly regulated by the energy efficiency requirements of the IPPC guideline (Freshfields Bruckhaus Deringer 2002).

Following the proposal on emissions trading, the granting of permits for greenhouse gas emissions will have to be based on the procedures under the IPPC Directive. But in contrast to other IPPC regulations, such a permit would only require the operator to hold a sufficient number of allowances to cover the installation's emission in a given period and not limit its direct emissions of carbon dioxide or other greenhouse gases except as they may have significant local effects. If the IPPC guideline and corresponding national regulations were modified such that the principle of preventive action and requirements on energy efficiency are not applied to emissions subject to a trading scheme, existing command-and-control instruments could be combined with emissions trading.

Emissions trading and voluntary agreements

Industry associations within the European Union have expressed their strong preference for long-term voluntary agreements as the prime instrument for the pursuit of climate policy goals. In most cases, voluntary agreements are based on specific targets expressed in emissions per output or energy use per output. At first glance, such relative industry targets are incompatible with national absolute targets because growth of industrial production can result in an increase of absolute industry emissions even if specific emissions are declining. This is in contrast with absolute targets imposed on the European Union and its member states by the Kyoto Protocol and the EU burden-sharing agreement (OECD 1998).

However, after the Kyoto Protocol had been passed, industry interest in using the flexible Kyoto mechanisms has increased although there are still only few concrete proposals on how to combine the Kyoto mechanisms and voluntary commitments. A corresponding approach has been developed and realised in the United Kingdom (ETG 2000).

The approach of the UK Emissions Trading Group (ETG) offers a practical answer on how to combine an emissions trading scheme with voluntary agreements. It distinguishes between a so-called "absolute" sector with absolute emission targets and a "unit" sector with agreements on specific targets. In the absolute sector, firms can participate in the emissions trading scheme voluntarily via the "direct route" by accepting an absolute cap on their carbon dioxide emissions, getting financial support in return. In the unit sector, firms that have joined the CCL Agreement take part via the "agreement route". In the absolute sector a cap-and-trade scheme is established while in the unit

[1] Council Directive 96/389/EC concerning integrated pollution prevention and control.

sector emissions trading is of the baseline-and-credit type. The former imposes an absolute cap on a single firm's emissions that can be freely traded among the participants of the scheme while the latter defines a baseline for the specific emissions of firms that have to buy allowances only if their specific emissions overshoot the baseline and can sell allowances only if they over-fulfil their obligations. The baseline is defined with respect to the industry's obligation in the voluntary commitment. The main difference between cap-and-trade and baseline-and-credit trading is that in the former participants hold property rights over all allowances whereas in the latter property rights are extended only to the "earned" credits which polluters obtain by over-achieving the emission reduction targets. Furthermore, the unit sector may only participate in national trading whereas companies in the "absolute" sector may participate in international emissions trading as well. To prevent allowances from the unit sector swamping the absolute sector, the scheme attempts to limit sales from the former to the latter via a "gateway". This means that trade between the "absolute" and the "unit" sector is unrestricted as long as there is no net flow from the "unit" to the "absolute" sector. In the reverse case, the gateway will be closed.

Emissions trading and eco/energy taxes

Both, energy and carbon-dioxide taxes and emissions trading schemes provide incentives to reduce CO_2 emissions. They differ in that price controls fix the marginal costs of compliance and lead to an uncertain level of total emissions whereas quantity controls fix the level of compliance but result in uncertain marginal costs. With respect to European and national emission reduction targets, emissions trading seems to be superior to eco-taxes. In many European countries climate-change related energy taxes or CO_2 taxes already exist, however, and will not be abolished in favour of trading schemes. In consequence, an additional burden would be placed on companies that are already subject to environmental taxation if they had to join an emissions trading scheme. To avoid this, a tax reduction could be given to firms that join the emissions trading scheme. This is the case in the United Kingdom where companies signing the climate change agreement and participating in emissions trading obtain an 80 percent reduction of the climate change levy. In Germany, energy-intensive industries already enjoyed an 80 percent reduction of the eco-tax until the end of 2002. From 2003 on this eco-tax reduction is only 40 percent. Therefore, an incentive for voluntary participation in the emissions trading scheme could be given by levying an eco-tax of only 20 percent on trading firms and of 60 percent on all others.

Concluding remarks

The superiority of the British emissions trading scheme lies in the clear interaction of already existing regulatory instruments, voluntary agreements and carbon taxes, on the one hand, and the new emissions trading scheme with the coexistence of absolute and relative reduction targets on the other. No wonder that the Dutch CO_2 Trading Group proposed the introduction of a similar scheme in the Netherlands. In this proposal a distinction is made between an "exposed" sector of energy-intensive industries faced with international competition and a "sheltered" sector embracing all other industries and private households. The exposed sector, which is subject to a voluntary commitment to the government, underlies relative reduction targets deduced from energy-efficiency standards that are part of the voluntary commitment, whereas an absolute emission target is imposed on the sheltered sector. In the exposed sector the initial allocation of emission allowances is free of charge; in the sheltered sector they are auctioned annually with the revenues of the auction being channelled back to the participating firms and households by means of a reduction of labour and income taxes and social security premiums. As in the British scheme, trading between the exposed and sheltered sectors is possible. To prevent an unanticipated increase in emissions from both the exposed and the sheltered sectors, the government should be able to adjust the amount of allowances quickly or to buy the excess supply of allowances from the market (Kink et al. 2002).

The British emissions trading scheme provides for interaction with existing regulations and voluntary agreements

If the Commission's proposal for a guideline on emissions trading were modified to a hybrid system akin to the British and the Dutch models, it would be easier to integrate already existing national schemes into the European trading system. For the first trading period 2005–2007 preceding the Kyoto commitment period, participation in emissions trading should be on a voluntary basis and the initial allocation of allowances should be free. In the absolute sector, these allowances should be allo-

cated according to the requirements of the IPPC guideline. In the unit sector, allowances for single firms should be allocated on the basis of output-related performance standards defined by voluntary commitments between the corresponding industry and the government. Trade in the absolute sector should be of the cap-and-trade type, and in the unit sector of the baseline-and-credit type. Allowance trading between both sectors should be possible but controlled by a gateway. As an incentive to join the emissions trading scheme, participating firms should obtain an energy/carbon dioxide tax reduction. In addition to allowances resulting from emission reductions within the European Union, Certified Emission Reductions (CERs) obtained from CDM projects and Emission Reduction Units (ERUs) resulting from Joint Implementation should be introduced in emissions trading within the EU from the beginning in order to benefit from cost efficient energy saving projects abroad.

The EU will allow opt-outs and opt-ins as well as pooling

The political agreement reached by the Council in December 2002 modifies some issues of the initial proposal. Although trading will start in 2005, individual installations or economic activities can be exempted from emissions trading in the initial period 2005–2007 ("opt-out"). Opt-outs are subject to approval by the Commission, on strict conditions. These notably include fulfilling the same emission reduction requirements as companies and installations participating in the scheme, which can be realised by instruments like voluntary commitments. In addition, member states can unilaterally include additional sectors and gases from 2008 on ("opt-in"). The agreement also provides for the possibility of companies pooling their emission allocations until 2012 ("pooling"), with a pool manager acting as representative on the market for emission allowances. Allocations of emission allowances will be free of charge, but Member States can auction off up to 10 percent of allowances from 2008 (EU Commission 2002).

While these modifications deal with special situations in certain member countries, the question of how to combine emissions trading and traditional environmental policy instruments in an optimal way still remains unanswered. We therefore urge the Commission to modify the proposal further by creating a hybrid emissions trading scheme similar to the British or Dutch type.

References

Council Directive 96/389/EC concerning integrated pollution prevention and control.

Egenhofer, Christian 2001. CEPS, *The Compatibility of the three Kyoto mechanisms and traditional environmental instruments,* Executive Summary in: Centre for European Policy Studies (CEPS), Progress Report of the Project, Subgroup 4: Sustainable Development, Brussels.

European Commission 2001. *Proposal for a Directive of the European Parliament and of the Council establishing a framework for greenhouse gas emissions trading within the European Community and amending Council Directive* 96/61/EC, Brussels, 23.10.2001, COM(2001)581.

European Commission 2002. Directorate General Environment, Press Release IP/02/1832.

Freshfields Bruckhaus Deringer 2002. *Luftbewirtschaftung durch europäischen Emissionshandel – Rechtliche Probleme des Richtlinien-Vorschlages der Europäischen Kommission für den Handel mit Treibhausgasemissionsberechtigungen in der Gemeinschaft,* Berlin.

Galeotti, Marzio, Carraro, Carlo 2001. *Traditional Policy Instruments, Kyoto Flexibility Mechanisms and Technological Change and Diffusion,* Report of the CEPS Climate Change Team, Chapter IV, Brussels.

Jones, Jane Wallace (ARPAV), Morere, Marina (ECOTEC), ten Brink, Patrick (ECOTEC) 2001. *Negotiated Agreements and Climate Change Mitigation,* Brussels.

Kiuk, Onno, Verbruggen, Harmen (IVM/VU, Institute for Environmental Studies, Vrije Universiteit Amsterdam), Mulder, Machiel (CPB) Netherlands Bureau for Economic Policy Analysis, 2002. *CO_2 emissions trading in the Netherlands: an assesysment of the proposal of the Dutch Trading Commission,* Amsterdam, March.

OECD 1998. *Voluntary Approaches for Environmental Protection in the European Union,* Paris, ENV/EPOC/GEEI(98)29/FINAL.

Osterkamp, Rigmar 2001. »Zur Besteuerung von Kohlendioxyd in Deutschland und Europa«, in: *ifo Schnelldienst* 4/2001 of 26.02.2001.

Rehbinder, Eckhard, Schmalholz, Michael 2002. *Handel mit Emissionsrechten für Treibhausgase in der Europäischen Union, Umwelt- und Planungsrecht* (UPR), 1/2002, p. 1-10.

Rennings, Klaus, et al. 1996. *Nachhaltigkeit, Ordnungspolitik und freiwillige Selbstverpflichtung: Ordnungspolitische Grundregeln für eine Politik der Nachhaltigkeit und das Instrument der freiwilligen Selbstverpflichtung im Umweltschutz,* ZEW, Heidelberg.

ETG, UK Emissions Trading Group, *Outline Proposal for a UK Emissions Trading Scheme.* Version of 13.1.2000.

THE EU PROPOSAL FOR EMISSIONS TRADING: A REASONABLE APPROACH?

PRO: EMISSIONS TRADING FOR EFFICIENCY, ENVIRONMENTAL PROTECTION AND EQUITY: THE CORNERSTONE OF EU CLIMATE POLICY

AXEL MICHAELOWA,

SONJA BUTZENGEIGER*

Climate policy – a task for generations

Global climate policy has gained prominence in the last decade and culminated in the negotiation of the Kyoto Protocol. It defines legally binding greenhouse gas reduction targets for industrialised countries and some countries in transition in the "commitment period" 2008 to 2012. They are likely to be strengthened subsequently in response to long-term reduction needs. In spite of being referred to as "dead" by many stakeholders, the Kyoto Protocol is alive and kicking and likely to enter into force within the next year. Industrialised countries will then face the challenge of implementing a policy mix that minimises overall compliance costs for their national economies. In a surprising move that made a lot of American observers envious, the EU has become a pioneer in emissions trading in less than three years.

Two birds with one stone: efficiency and environmental protection through emissions trading

While being a frontrunner in suggesting stringent targets, the EU's performance in introducing far-reaching policy instruments has been disappointing as the slow burial of a common CO_2-/energy tax shows. After one decade of ad hoc policies and reliance on the historical accidents of German reunification and the British "dash for gas", it dawned on the Commission that current national policies would not reach the EU's Kyoto commitment. In a courageous U-turn the Commission decided that an internal emissions trading system for large emitters provided the only powerful and effective alternative to an emissions tax.

Efficiency demands mandatory participation, as in a voluntary system only those emitters can be expected to participate who see themselves in a seller's position[1], hence no market would emerge. The direct inclusion of entities – be it installations or companies – in emissions trading has several advantages:

1. Emissions trading directly targets absolute GHG-emissions, whereas emissions and energy taxes as well as efficiency standards only have indirect effects. Thus, governments would not have to follow a "trial-and-error-process" to reach their Kyoto target.

2. Entities can evaluate their internal reduction potential much better than government. The cost of emissions allowances will provide a clear and simple incentive.

The inclusion of the Kyoto Mechanisms will further and significantly reduce costs. Whereas price estimates for a purely internal market range between 18 and 33 €/t CO_2, forecasts for world market prices range from 2 to 8 €/t CO_2. The World Bank's Prototype Carbon Fund pays about 3.5 €/t for millions of tons of CO_2.

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[1] Unless excessive (financial) incentives are provided.

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Equity: Can the third dimension of the trading scheme be managed in the EU?

Surprisingly, resistance to emission trading has come from industry stakeholders traditionally in favour, mainly in Germany. It may be due to the fear of absolute emissions targets and comparative disadvantages, particularly compared to the United States. However, many US companies call for clear, long-term climate policy perspectives. Already several regional GHG-emission trading schemes have been set up.

Under grandfathering, the ex-ante-costs for participants will be close to zero. The draft directive does not require any concrete allocation formulas and sets only broad criteria. National governments thus have the freedom to consider special national circumstances, be it on the industrial or sectoral level. Existing voluntary agreements can build the basis for national allocation.

CONTRA: MANY OPEN QUESTIONS

GÜNTER ROEDER*

After the EU Council of Environment Ministers endorsed the Directive on Emissions Trading in December 2002 the contra position seems to have been consigned to history. Roma locuta, causa finita (Rome has spoken, the campaign is over), emissions trading is coming anyhow. Nevertheless, many questions which would warrant further discussion remain open.

In order to set out the historical record one last time the following should be noted. The chemical industry has never formulated a contra position on environmental conservation and on the careful husbanding of energy but rather adopted from the outset a clear pro position on ecological and economic grounds. Thus, the European chemical industry set a target to reduce CO_2 equivalents by 30 percent from 1990 to 2010. In Germany the chemical industry has already lowered its energy-related emissions by 33 percent between 1990 and 2001. By 2012 it aims to reduce specific energy consumption by 35 to 40 percent and to achieve absolute reductions in greenhouse gases causing global warming (CO_2 equivalents) of 45 to 50 percent.

- The directive still involves considerable risks for the affected companies. These threats do not arise from trading in CO_2 certificates but rather from the upper CO_2 limits which each EU Member State must lay down for plants. The directive indeed allows great freedom in the organisation of national allocation plans for CO_2 certificates. But, in fact, the allocation has to be made in compliance with the national burden-sharing targets of the EU. Germany has committed itself to an absolute reduction of all CO_2 emissions of 21 percent with respect to the base year, 1990. In reaching their burden-sharing targets the EU and its Member States are confronted with enormous challenges. Only the United Kingdom and Germany are well on the way to fulfilling their quotas.
- German industry will not be *the* vendor of certificates to other EU states. Although it has achieved substantial reductions, these are counterbalanced by unchecked emissions in the household and transport sectors. The German federal government will have to take this into account in accordance with the provisions of the directive when drawing up the national CO_2 allocation plan.
- Individual EU states have already declared their intention of buying CO_2 certificates on the international market in order to protect the competitiveness of their companies. However, neither in the EU nor globally are procedures and financing methods for this purpose regulated. A mandatory requirement of companies for emissions trading with third countries, however, is that international agreements have been concluded.
- The de facto objective of the directive is that many of the companies covered by the directive must buy CO_2 certificates in order to maintain production. They will certainly need to buy even more certificates if they wish to continue growing. Since the EU Commission has already estimated the costs at € 20 to 33 per metric ton of CO_2, the producing industry is threatened with considerable additional costs.
- There is a further risk in that companies which aim to or have to avoid additional costs will shift their investments to third regions which have either not ratified the Kyoto protocol or have no reductions imposed on them by the Kyoto protocol. As a result, global CO_2 emissions would not drop, the sources of CO_2 would only be shifted from one region to another. This would provide no remedy for the environment, either in Europe or globally. The EU would only look better in the CO_2 statistics.

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The Credit Crunch: A Comparison of Germany and Japan

Frank Westermann*

The credit crunch suffered by private enterprises is contributing to the current economic slowdown in Germany. Small firms are affected in particular, while larger firms increasingly substitute other forms of external finance.[1]

The main reason for this development is the increased risk of non-performing loans after the credit-boom of the late 1990s[2], the stock market decline after the year 2000 and the banks' efforts to strengthen and adjust their balance sheets in the light of Basel II and the possible loss of their "triple A" rating.

In many respects this development is reminiscent of the beginning banking crisis in Japan in the early 1990s. Here, the lending boom of the late 1980s also ended in a stock market crash, while banks aimed to achieve the Basel I accord until 1993. The magnitude of the problem clearly differs, but the causes and the development of macroeconomic variables are remarkably similar in the two countries.

Even though the German banks are in a better condition, and a crisis to the extent of the Japanese banking crisis appears unlikely, the problem of a German credit crunch must be taken seriously. It could still have a substantial impact on the real economy, in particular when complementing other domestic problems in the labour market and an overvalued real exchange rate. Furthermore, the number of stabilisation instruments is smaller in Germany than in Japan. The Maastricht criteria constrain fiscal policy, and the ECB is not likely to reduce interest rates to zero – like the bank of Japan – in order to stimulate investment in Germany (see Sinn and Reutter 2000). A comparison of the two countries therefore makes sense despite the differences in the magnitude of the problem.

In comparing Germany and Japan, the first analogy is that initially the phenomenon of a credit crunch is denied.[3] Usually, aggregate bank lending or interest rates are chosen as indicators of a credit crunch which may not display a clear picture. In the following we argue that these two indicators alone are not sufficient to verify the existence or absence of a credit crunch and a comparison is made between these and other macro variables in Germany today and in Japan in the early 1990s.

We find a remarkable similarity in the time path of key macro variables. The aggregate credit volume, the development of stock prices and of new equity issues in both countries, before and after the beginning of the credit crunch, are very similar. Japanese as well as German banks hold substantial amounts of equity in other firms. Changes in stock prices – in contrast to other OECD countries – therefore directly translate to the banks' balance sheets. In the Basel I agreement these equity holdings are considered "Tier 2 Capital", relevant for the risk adjusted capital asset ratio. A reduction in its value therefore contributes to the credit crunch in both countries.

We also take a look at substitution effects in the mix of firms' external financing, and at direct surveys. Both indicate a credit crunch in Germany, starting in the first quarter of 2001 and in Japan, starting in the fourth quarter of 1991.

The usual suspects

Aggregate Credit Volume

As shown in Figure 1a, the aggregate credit volume has stagnated in Germany since the first quarter of 2001. This is not sufficient to indicate a credit crunch, however, as it is impossible to distinguish the supply of and the demand for credit.[4]

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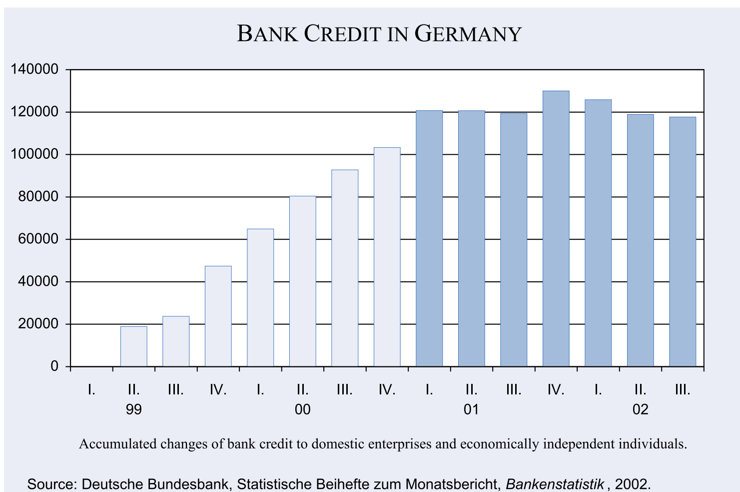
[1] Since asymmetric information exists between banks and their clients, a situation can arise, where firms cannot obtain credit, even though they are willing to pay the market interest rate. The reason why the interest rate does is not simply increased according to the average risk characteristics of the firms, is that in this case the good risks will stay away from the market – an adverse selection with only the bad risks remaining. This is exactly what the banks try to avoid in the present situation.

[2] See Hans-Werner Sinn (2002).

[3] The joint economic forecast of the German economic research institutes (Gemeinschaftsdiagnose der Wirtschaftsforschungsinstitute), as well as the Bundesbank and the German Council of Economic Advisors (Sachverständigenrat) reject the hypothesis of a credit crunch in Germany ("All in all the institutes do not see a clear indication that there exists a distortion in credit intermediation in Germany", Gemeinschaftsdiagnose 2002, p. 34).

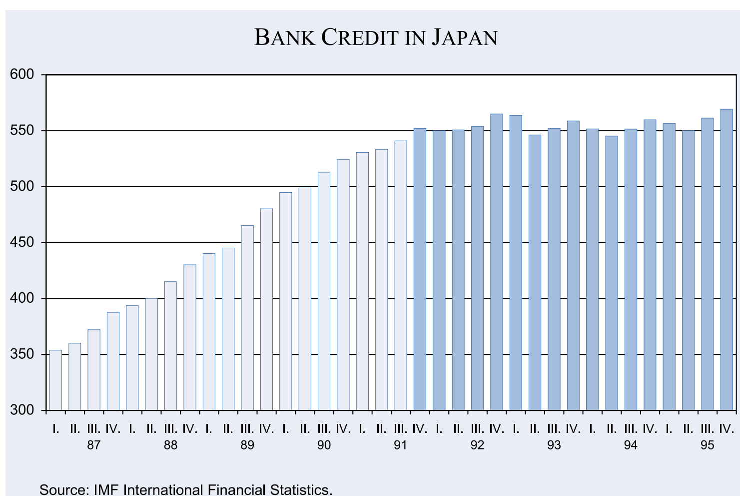
[4] This is also the case when the development is displayed as a ratio, relative to GDP, as in Figure 4.1. in the Joint Economic Forecast.

Figure 1a



Note: The figure shows the accumulated changes of bank credit to domestic enterprises and economically independent individuals.

Figure 1b



Nevertheless, this first indicator already displays a striking similarity to the development of credit in Japan at the beginning of the banking crisis: In the first quarter of 2001 in Germany and the fourth quarter of 1991 in Japan, there was a clear structural break in the time path of aggregate credit (see Fig. 1b).

In the case of Japan there seems to be agreement that a credit crunch was present after the banking crisis in 1990. As the German development of aggregate credit looks so similar, it is at least unlikely that the German credit slowdown was entirely demand driven, while that of Japan was mostly the result of a lack of supply.

Interest rates

The level of interest rates is often quoted as a further indicator of tight credit conditions. High interest rates, so the argument goes, makes credit less affordable, forcing small firms into bankruptcy. Pointing at the presently quite low level of interest rates, the credit crunch hypothesis for Germany is often rejected.

This indicator, however, is also not sufficient – it is not even necessary. A reduction in credit volume due to high interest rates need not be inefficient. Not every project should receive financing, in particular under risk. As long as only those projects are financed, whose marginal product of capital is higher than the interest rate, there is no distortion in financial intermediation and capital markets are functioning well. A "credit crunch" is only present when firms with profitable projects cannot obtain credit in spite of low interest rates (lower than the expected marginal product), because banks are credit rationing. In Japan, for instance, the credit crunch co-exists with near zero interest rates.[5]

Stock prices and new stock issues

The second analogy in the experiences of Germany and Japan is the development of stock prices and the issuance of new equity. These indicators are interesting for at least two reasons. Banks in Germany as well as in Japan hold substantial amounts of equity in their portfolios. In the Basel I agreement, Japan negotiated this equity to count as "Tier 2 Capital" making them relevant for fulfilling the risk-adjusted capital asset ratios. While not typical of other OECD countries, in Germany and Japan it means that changes in stock prices directly translate to balance sheet problems of the banking system.[6] Ito

[5] The increase in interest rates relative to government bonds is displayed in Figure 4.2 of the Joint Economic Forecast.

[6] In Germany this was not possible due to a principle of conservative accounting called the "Niederstwertprinzip". According to this principle, stocks are listed on the balance sheets according to their book value at the time they were purchased, not at their present value. Nevertheless, the implicit increases in value surely were taken into account by the rating agencies as additional hidden reserves, even if they were not explicitly shown in the balance sheets. Since 2001, Germany has switched to the US accounting standards, where stocks that are not intended for immediate sale are regularly value-adjusted.

(1996) has argued that this was the main reason for the banking crisis and the subsequent credit crunch in Japan, and also the reason why other countries, like the United States, France or Italy, which also experienced stock market crashes, did not experience such a strong impact on the banking system.

In both countries – Germany and Japan – the structural break in aggregate credit was preceded by a stock market crash, approximately one to two years before the credit crunch. In Germany it happened in January 2000 – about one year before the break in aggregate credit, in Japan in September 1989, two years before its structural break in bank lending (see Fig. 2a and 2b).

Falling stock prices do not only affect the banks directly via their balance sheets, but they also indirectly reduce their ability to meet the Basel I and II agreements. In principle there are two ways to increase the capital asset ratio, either by raising additional capital or by reducing lending. The indirect effect of the stock market crash is to make the former option more difficult. Figures 3a and 3b show that the new issues of equity are highly correlated with the stock prices themselves. The difficulty of raising new capital in the stock market makes the reduction of lending the only alternative for raising the capital asset ratio.

Figure 2a

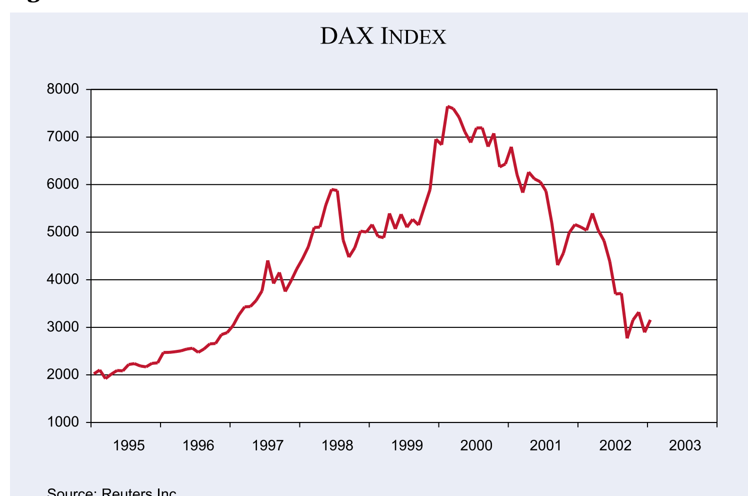
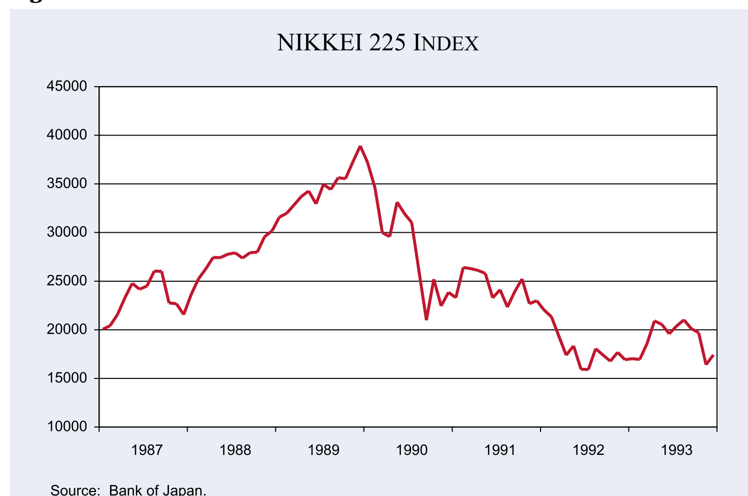


Figure 2b



Alternative indicators

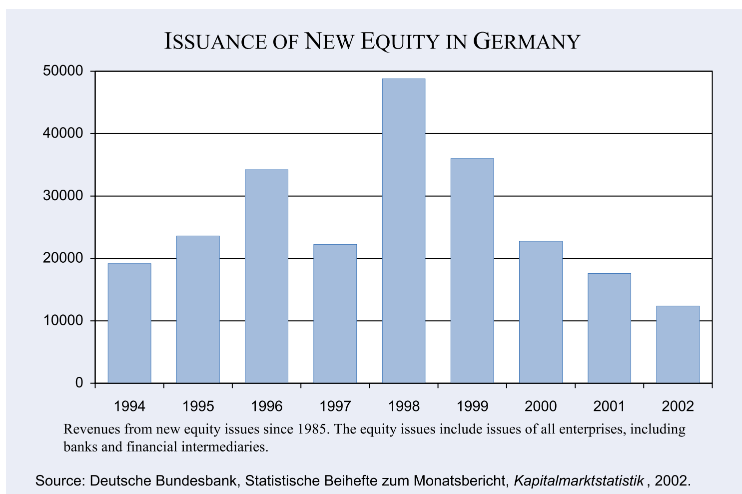
External financing mix

More informative than the volume of aggregate lending is the development of important substitutes for bank credit: short-term commercial paper. This indicator is used in a paper by Kashyap, Stein und Wilcox (AER 1993) for the United States, who find that after contractionary monetary policy of the Fed, firms substitute commercial paper for bank credit. This is taken as evidence of the credit channel of monetary policy.

Under the assumption that changes in aggregate credit are due to changes in the *demand* for credit, one would expect that all substitutes of bank credit should display a similar behaviour. The amount of commercial paper held and issued by firms should therefore also decline. As Figure 4a shows, this was not the case in Germany after aggregate credit began to stagnate. On the contrary, the beginning of the credit crunch and the structural break in aggregate lending coincide with a boom in alternative sources of financing. This points to the view that there must at least *also* have been a supply side change that affected some firms in a credit crunch situation.

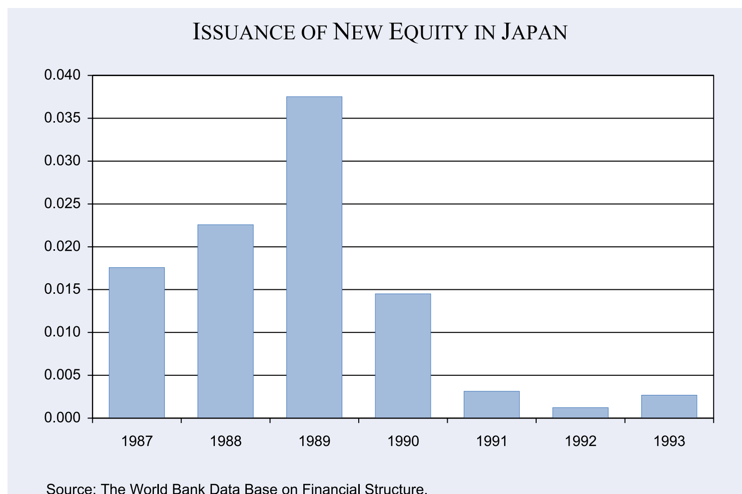
When looking at new net issuance of short-term commercial paper as a share of total external finance (bank credit

Figure 3a



Note: The figure shows the revenues from new equity issues since 1985. The equity issues include issues of all enterprises, including banks and financial intermediaries.

Figure 3b



Note: The figure shows the issues of new equity relative to GDP.

plus commercial paper), the substitution of bank credit by other forms of external finance becomes very clear. The share of commercial paper accumulated from the beginning of 1999 until mid-2000 is close to zero. After 2001 it rises to 5%. Although the Bundesbank and the Joint Economic Forecast of the research institutes point to this development, they argue that commercial paper is a negligible component of total financing. Even though this is correct when comparing the stocks of bank credit and commercial paper, the relevant indicator is the relative changes in or the new issues of commercial paper and bank credit. Here, the share is much higher.

Alternative explanations of increased use of commercial paper include the slowdown in the issuance of new equity, as this equally applies to banks and non-banks.[7] However, there are several reasons for not including new equity in the comparison. If the reduction of new equity issue were the reason for the increase in commercial paper issue, then, without a credit crunch, one would expect all substitutes (external financing via commercial paper and bank credit) to increase equally. Furthermore, the decline in the issuance of equity had already started in 1998, almost three years before the beginning of the credit crunch. The substitution by commercial paper exactly coincides with the structural discontinuity in aggregate credit.[8] Also, in a long-run comparison, the funds raised by the issuance of new equity is not very low.

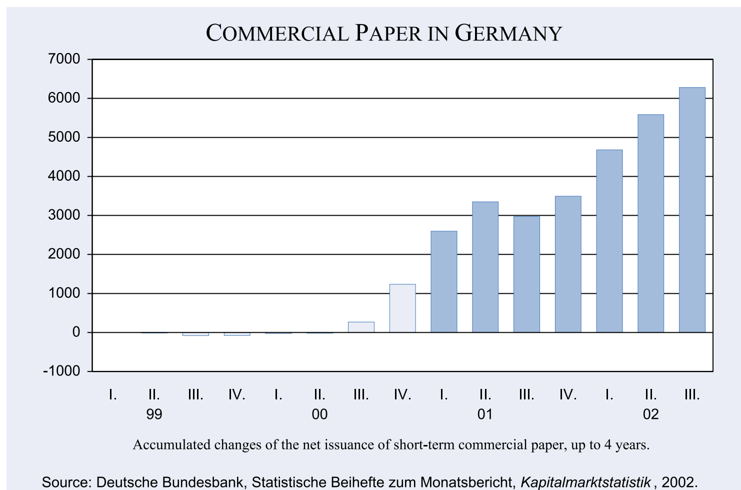
A similar behaviour is also observable in Japan, although the changes in the composition of external finance are less clear than in Germany. Although the net issue of commercial paper is higher in 1991 than in 1988 and 1989, the year of the stock market crash, a longer-run downward trend started in 1990. (see Fig. 4b).

Direct surveys

The most direct way to assess the presence of a credit crunch and to distinguish supply-side from demand-side effects is to directly ask the firms about the banks' lending attitude. Figure 5 shows the results of the TANKAN-Survey in Japan, which asks firms about the perceived lending attitude of the banks. This question can be answered

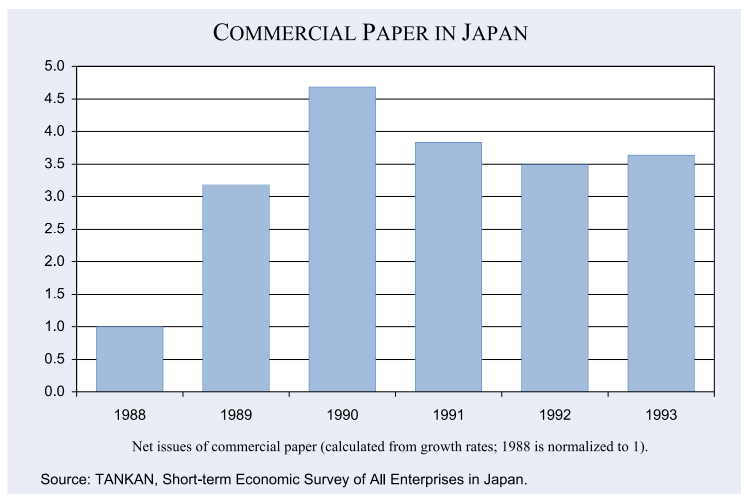
[7] A further reason is the increased efficiency of the bond market following the introduction of the euro. However, even if this were the main reason, it remains an indicator of a continuing demand for external finance.
[8] Furthermore, there is a fundamental difference between a firm's decision to use external or internal finance. Bank credit and commercial paper are therefore likely to be closer substitutes than equity issuance.

Figure 4a



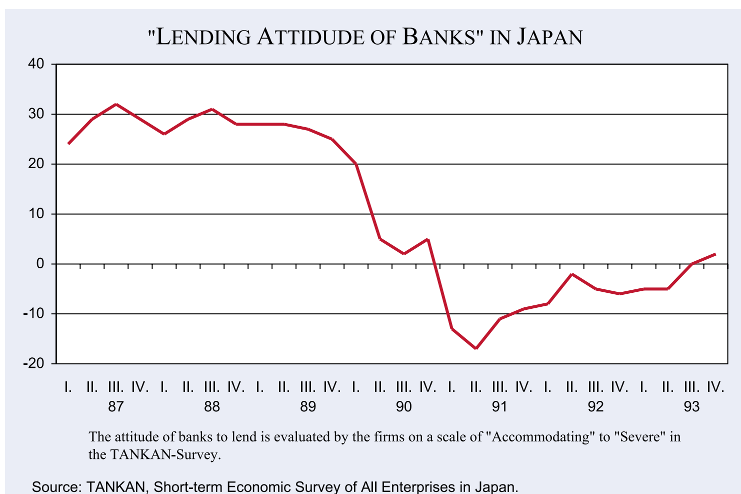
Note: The figure shows the accumulated changes of the net issuance of short-term commercial paper, up to 4 years.

Figure 4b



Note: The figure shows the net issue of commercial paper (calculated from growth rates; 1988 is normalized to 1).

Figure 5



Note: In the TANKAN Survey ‚Banks' attitude to lend is evaluated by the firms on a scale of "accommodating" to "severe".

on a scale of 100 (accommodating) to – 100 (severe). Cargill, Hutchison and Ito (2000) as well as Hutchison (2000) use this indicator to point to the fact that Japanese firms are affected strongly by the credit crunch even today. In the third quarter of 2002, the index value still stood at – 2.3. Therefore a demand-side driven reduction in aggregate lending cannot be the full explanation.

Although no comparable indicator exists in Germany at this point, the Ifo Institute, which conducts regular surveys on the business climate in Germany, will start this year asking a question corresponding exactly to the formulation of the one used in the TANKAN-Survey. This will allow monitoring the effects of the Basel II agreements on the lending behaviour of banks and a direct comparison between Germany and Japan.

A telephone survey similar to this was already conducted by the Ifo Institute in 2002 (see Russ 2002). This telephone survey of 1,100 representative enterprises in Germany showed that 38% of the firms that wanted to obtain new credit had to exert greater effort to get the credit authorised. 27% of the firms said that they did not obtain any credit despite their efforts, 11% had to pay higher interest rates and only 22% of the firms that had applied for credit responded that they did not experience any problems. Furthermore, 14% of the firms had existing credit lines cancelled by the banks and a further 10% were just able to prevent such a cancellation.

Concluding remarks

The credit crunch in Germany and the banking crisis in Japan are not comparable with regard to the extent of the problem. A crisis of this dimension is not likely in Germany. Nevertheless, the development of several variables is remarkably similar and needs to be taken seriously, as even a problem much smaller than that of the Japanese banking sector could mean a substantial impairment of real growth in Germany.

In Japan, the problems in the banking system were recognised too late and were initially not taken seriously. In order to prevent this same mistake, the development of the credit markets in Germany must be closely monitored and analysed further.

References

Cargill, Th., M. Hutchison and T. Ito (2000), *Financial Policy and Central Banking in Japan.* MIT Press.

Deutsche Bundesbank (2002), "Zur Entwicklung der Bankenkredite an den Privaten Sektor", *Monatsbericht*, Oktober.

Gutachten der wirtschaftswissenschaftlichen Institute (2002), "Die Lage der Weltwirtschaft und der deutschen Wirtschaft im Herbst 2002", *ifo Schnelldienst* 55 (20), 3–50.

Hutchison, M. (2000), "Japan's Recession: Is the Liquidity Trap Back?", Federal Reserve Bank of San Francisco, *Economic Letter* (Pacific Basin Notes) 2000-19; June 16.

Ito, T. (1996), "Impacts of the Basle Capital Standard on Japanese Banks' Behaviour", *NBER Working Paper* No. 6730.

Kashyap, A., J. Stein and D.W. Wilcox (1993), "Monetary Policy and Credit Conditions: Evidence From the Composition of External Finance", *American Economic Review* 83 (June), 78–98.

Russ, H.G. (2002), "Kreditnachfrage schwach, aber auch Kreditvergabe restriktiver, Ergebnisse einer aktuellen Telefonumfrage", *ifo Schnelldienst* 55 (21), 28–29.

Sinn, H.-W. und M. Reutter (2000), "The Minimum Inflation Rate for Euroland", NBER Working Paper No. 8085, 2001, *CESifo Working Paper* No. 377.

Sinn, H.-W. (2002), "Die Rote Laterne", *ifo Schnelldienst* 55 (23), 2002 (Special Issue).

Sinn, H.-W. (2002), "The Laggard of Europe", papers presented at the Academy of Sciences of North Rhine-Westphalia on 13 November.

Has the Retail Bank Interest Rate Pass-through been Atypical in 2002?

Gabe de Bondt*

Introduction

The adjustment of retail bank interest rates to market interest rate changes in the euro area is a key link in the monetary transmission process. Retail bank interest rates reflect the prices of money and credit, which, in turn, are important for firms and households and therefore for monetary policy. Following the decision of the ECB Governing Council to lower the interest rate on its main refinancing operations by 50 basis points on 5 December 2002, much attention was devoted in the media to the retail bank interest rate pass-through process in Germany. This discussion was triggered by some statements of banking officials, who said that German banks could currently not afford to pass through the ECB interest rate cut, given concerns about German banks' margins and therefore profitability.

Against this background, this article briefly reviews the relevant issues regarding the interest rate pass-through process and examines whether the developments in 2002 have been in line with the adjustment of bank lending and deposit rates to changes in market interest rates as observed for the years 1999–2001. In this respect, the German experience is compared with that of the euro area.

What do we know from past experience about the interest rate pass-through?

Four main issues emerge from past experience about the interest rate pass-through.

First, a distinction should be made between an immediate or short-term adjustment of retail bank interest rates to changes in official and market interest rates and a final or long-term adjustment.[1] Retail bank interest rates adjust with a delay to changes in official and market interest rates, that is the immediate, i.e. same month, pass-through tends to be incomplete although typically there is a close to one-to-one pass-through in the long term of changes in market interest rates to retail bank interest rates. Short-term stickiness of retail bank interest rates can, among other factors, be explained by administrative costs of price changes, maintaining bank-customer relationships, risk premia and uncertainty about whether market interest rate changes are temporary or permanent.

The second important issue for the retail bank interest rate pass-through process is that maturity matters.[2] For instance, banks prefer to fund their loans with a comparable maturity to avoid interest rate risk due to a mismatch between their assets and liabilities and offer loans at rates which are competitive to those on non-bank sources of finance. This implies that long-term lending rates are expected to adjust more to changes in government bond yields than to money market interest rate movements.

Third, an important difference between the adjustment of lending compared to deposit rates is that credit risk considerations will play a role in the way the former respond to official interest rate changes (for empirical evidence for Germany see Winker 1999). In addition, the degree and speed of the interest rate pass-through highly differs across different segments of the retail bank market. This reflects, among other factors, differences in the degree of competition and market power of banks. The fourth and final issue is that the retail bank interest rate pass-through may change over time. Several studies provide evidence supporting the fact that the speed at which retail bank interest rates adjust to changes in market interest rates has become quicker since the introduction of the

* European Central Bank. Comments by Hans-Joachim Klöckers and John Fell are appreciated. All views expressed are those of the author alone and do not necessarily reflect those of the ECB or the Eurosystem.

[1] See B. Mojon, (2000), "Financial structure and the interest rate channel of ECB monetary policy", ECB Working Paper, 40; L.A. Toolsema, J.-E. Sturm and J. de Haan, (2001), "Convergence of monetary transmission in EMU: new evidence", CESifo Working Paper, No. 465; F. Heinemann and M. Schüller, (2002), "Integration benefits on EU retail credit marekts – evidence from interest rate pass-through", Zentrum für Wirtschaftforschung; and S. Kleimeier and H. Sander, (2002), "Consumer credit rates in the eurozone: evidence on the emergence of a single retail banking market", European Credit Research Institute Research Report, 2.

[2] Arguments and empirical evidence in favour of this for the euro area is provided in G. de Bondt, (2002), "Retail bank interest rate pass-through: new evidence at the euro area level", ECB Working Paper, 136 and for euro area countries in G. de Bondt, B. Mojon, and N. Valla, (2002), "Interest rate setting by universal banks and the monetary policy transmission mechanism in the euro area", CEPR Conference Paper, Conference entitled "Will universal banking dominate or disappear? Consolidation, restructuring and (re)regulation in the banking industry, Madrid 15 and 16 November.

euro.[3] Furthermore, the speed at which bank lending rates adjust to changes in market rates may depend on time-varying bank-specific characteristics, such as bank profitability and its interplay with bank refinancing conditions (Weth 2000).

What is a typical response of retail bank interest rates to market interest rate changes?

Bank lending rates

Table 1 provides insight into the typical response of bank lending rates in both Germany and the euro area during the first three years of Stage Three of EMU. The immediate (or within one-month) adjustment to a change in corresponding market interest rates was incomplete in all cases and typically amounted to between 40% and 75%. The immediate adjustment of bank interest rates on consumer lending and short-term lending to enterprises varies, however, between 5% and 25%. In contrast, in the long term, a complete adjustment of all bank lending rates to market rates with a comparable maturity is found. The mean adjustment lag at which market interest rates are fully passed through to lending rates is generally up to 4 months. The main exceptions are the slow adjustment speed of the interest rate on short-term lending to enterprises in Germany of 6 months and of the interest rate on consumer lending in both Germany and the euro area of around 1 year.

[3] See footnote 2.

Bank deposit rates

Table 2 provides insight into the typical response of bank deposits rates in both Germany and the euro area during the first three years of Stage Three of EMU. The immediate (or within one-month) adjustment to a change in corresponding market interest rates has been incomplete in all cases. A typical immediate adjustment of deposit rates varies between 45% and 55%. The immediate adjustment of bank rates on deposits redeemable at notice of up to three months and overnight deposits is, however, found to be less than 20%. The long-term adjustment of deposit rates to a change in market rates with a comparable maturity is found to be up to 85%. In contrast to bank lending rates, all deposit rates adjust in the long term by less than one-to-one to market interest rate developments. The mean adjustment lag at which market interest rates are fully passed through to deposit rates is generally up to 2 months. The exceptions are the slow adjustment speed of the interest rate on deposits redeemable at notice of over three months in Germany and the euro area. The mean speed at which these deposit rates finally adjust to market interest rate developments is found to be around 6 months.

It should be noted that these results, just as those for lending rates, might be affected by the choice of the market rate with the most comparable maturi-

Table 1

Overview of adjustment of bank lending rates to market interest rates in Germany and the euro area

(100 basis point change in comparable market rate passed through to bank lending rate in basis points)

Bank lending rate	Market interest rates with a comparable maturity	Immediate adjustment[a)]	Final adjustment[b)]	Adjustment speed (in months)
Germany				
Up to 1 year to firms	Twelve months	6	94**	5.7**
Over 1 year to firms	Five-eight years	56**	114**	1.8**
Consumer lending	Three-five years	8*	119**	15.4
House purchase	Three-five years	73**	98**	0.4**
Euro area				
Up to 1 year to firms	Six months	23**	90**	3.0**
Over 1 year to firms	Two years	42**	95**	3.6**
Consumer lending	Two years	7	78**	8.5**
House purchase	Five years	44**	103**	2.4**

Notes: [a)] Adjustment in the first month. [b)] In all cases the final adjustment is not statistically different from 100, i.e. there is a complete long-term adjustment. ** and * denote significance at the 1% and 5% level, respectively. For a model description see ECB Working Paper No. 136.

Sources: Bundesbank, ECB, Reuters, and author's estimations based on sample 1999.01–2001.12.

Table 2

Overview of adjustment of bank deposit rates to market interest rates in Germany and the euro area

(100 basis point change in comparable market rate passed through to bank deposit rate in basis points)

Bank deposit rate	Market interest rates with a comparable maturity	Immediate adjustment[a)]	Final adjustment[b)]	Adjustment speed (in months)
Germany				
Up to 3 months notice	Three months	17**	35*	7.3
Over 3 months notice[c)]	Twelve months	45**	83**	1.9**
Maturity of one month	One month	54**	72**	1.0**
Maturity of three months	Three months	50**	83**	0.9**
Euro area				
Overnight	Overnight	7**	61**	1.5**
Up to 3 months notice	Three months	6	30**	5.1**
Maturity up to 2 years	Three months	43**	76**	1.0**
Maturity over 2 years	Two years	43**	64**	1.1**

Notes: [a)] Adjustment in the first month. [b)] In all cases the final adjustment is statistically different from 100, i.e. there is no complete long-term adjustment. [c)] Same results are found for the euro are, since Germany has for the euro area bank rate a country weight of 100%. ** and * denote significance at the 1% and 5% level, respectively. For a model description see ECB Working Paper No. 136.

Sources: Bundesbank, ECB, Reuters, and author's estimations based on sample 1999.01-2001.12.

ty. For instance, German deposits redeemable at notice of up to three months, cover special savings accounts with specific contractual conditions which usually reflect in their remuneration the movement of longer-term market interest rates.

Has the retail bank interest rate pass-through been atypical in 2002?

To assess whether the 2002 experience was different compared to that in the period from 1999 to 2001, a sequence of one-month ahead forecasts (red lines in Chart 1) for the retail bank interest rates considered and its 95% confidence interval (dotted lines in Chart 1) are calculated.[4] These forecasts are based on actual values for the lagged retail bank interest rates and on the typical retail bank interest rate pass-through seen in 1999-2001 by estimating a model over this period, as summarised in Table 1 and 2. The yellow lines in Chart 1 are the actual values for the retail bank interest rates.

Broadly speaking, retail bank interest rates adjusted in 2002 in a typical way to changes in market interest rates with a comparable maturity. The main exception regarding lending rates is, however, that the interest rates on loans to enterprises have been stickier since the summer of 2002 than models may have predicted on the basis of previous experience (see top panel of Chart 1). The latter finding is particularly marked in the case of Germany, where short-term lending rates to enterprises have remained fairly stable since July, while the model would have predicted a slight decline. But also for long-term lending rates to enterprises, the bank rates were higher than predicted by the model, albeit not at a statistically significant level. The main atypical observations found for deposit rates are that the German interest rates on deposits with an agreed maturity of one month and of three months, respectively, adjusted more quickly to falling money market rates in December 2002 than might have been expected from past experience (see bottom panel of Chart 1).

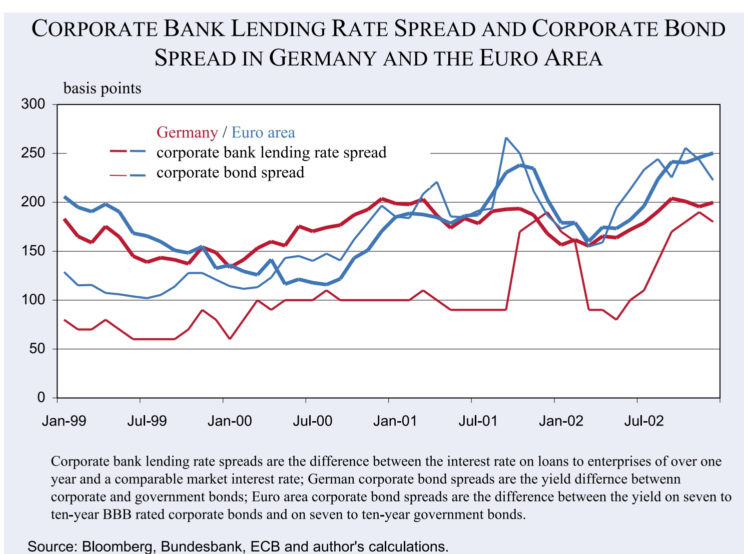
In sum, these findings show that banks in Germany were slower in lowering their corporate lending rates than usual in the second half of 2002, but at the same time much quicker than observed in the past to lower their rates on deposits with an agreed maturity, following the ECB Governing Council decision to lower interest rates by 50 basis points on 5 December 2002. This suggests that the retail bank interest rate pass-through has been asymmetric in December 2002, e.g. deposit rates are quicker to adjust downwards than lending rates in a environment of falling market interest rates.

[4] Chart 1 plots this for the retail bank interest rates which show a striking a-typical behaviour. Charts for the other retail bank interest rates are available upon request.

Chart 1

Source: Bundesbank, ECB and author's calculations and estimations.

Chart 2



Corporate bank lending rate spreads are the difference between the interest rate on loans to enterprises of over one year and a comparable market interest rate; German corporate bond spreads are the yield differnce between corporate and government bonds; Euro area corporate bond spreads are the difference between the yield on seven to ten-year BBB rated corporate bonds and on seven to ten-year government bonds.

Source: Bloomberg, Bundesbank, ECB and author's calculations.

Do credit risk considerations help in explaining the atypical sticky corporate lending rate?

A likely explanation of the more than usual sluggish behaviour of corporate bank lending rates is credit risk considerations. Corporate bond spreads can provide an indication of the market perceptions of the prevailing degree of corporate credit risk (see Chart 2). In fact, this indicator suggests that credit risk concerns rose considerably in 2002, in particular in the second half of 2002. These concerns can also be seen in the spread between bank lending and market interest rates. Furthermore, it should be kept in mind that corporate bond spreads, based on one particular rating category may be biased if there are substantial numbers of credit rating downgrades from that credit tier as was the case in 2002.

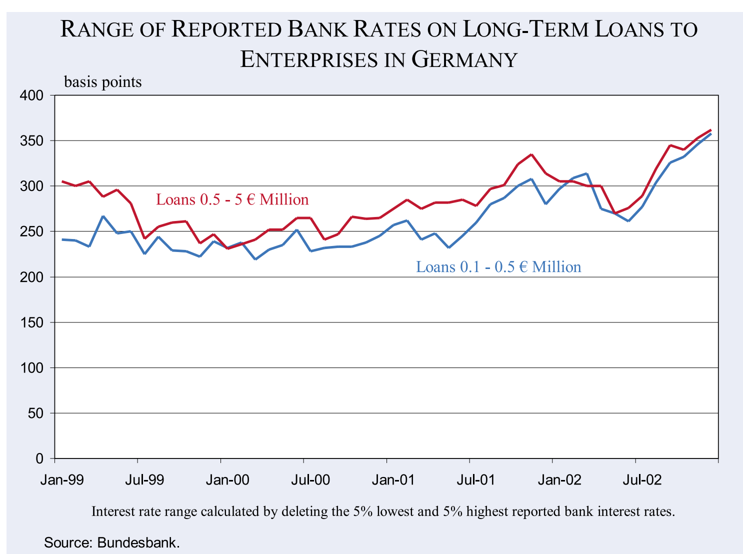
Further evidence in favour of relatively high credit risk concerns in the fourth quarter of 2002 is that the interest rates on long-term corporate loans, as set by German banks, diverged more than usual across borrowers (see Chart 3). This suggests a relatively large difference between bank perception of the credit risk of "bad" and "good" borrowers.

In sum, there can be good reasons to assume that the observed atypical pass-through to loans to enterprises reflected, at least to some extent, credit risk considerations.

Concluding remarks

To examine the retail bank interest rate pass-through it is

Chart 3



Interest rate range calculated by deleting the 5% lowest and 5% highest reported bank interest rates.

Source: Bundesbank.

important to i) distinguish between an immediate and final adjustment of retail bank interest rates, ii) take into account the maturity of the retail bank rates, iii) take account of credit risk developments regarding bank lending rates, and iv) consider the possibility of time-variation in the retail bank interest rate pass-through process.

Experience of the first three years of Stage Three of EMU suggests that for most bank lending and deposit rates, it may take up to 4, respectively, 2 months before the adjustment process of retail bank rates is completed. The adjustment speed is, however, found to be significantly lower for the interest rate on loans to enterprises of up to one year in Germany (6 months), on consumer lending in Germany and the euro area (12 months) and on deposits redeemable at notice of up to three months in Germany and the euro area (around 6 months).

Turning to developments in 2002, the majority of the responses of retail bank interest rates in Germany and the euro area to changes in market interest rates with a comparable maturity was reasonably consistent with past trends. However, the interest rates on loans to enterprises have, notably in Germany, behaved a bit differently since the summer of 2002 from what might have been expected on the basis of past trends. A likely explanation for this atypical sticky interest rate behaviour is that credit risk considerations played some offsetting role. At the same time, the interest rates on German deposits with an agreed maturity of one month and of three months, respectively, adjusted much more quickly to the decline in money market rates in December 2002 than expected from past experience. This suggests that at least in certain segments of the German retail bank market banks, with high loan-loss provisioning needs and profits under pressure, have been attempting to maximise their margins through an asymmetric interest rate pass-through in late 2002.

A Constitution for Europe – Comments and Proposed Corrections

Twenty Mezzogiornos*

Hans-Werner Sinn**

Europe will soon have a constitution. But if the draft presented by Valery Giscard d'Estaing is anything to go by, it will be imbued with old ideology. The document ignores free-market economics. There is not a word about the protection of property rights, and no commitment to free enterprise and the division of labour. Instead, it contains dubious secondary objectives like "sustainability" or "balanced economic growth", as if a constitution could ensure that such concepts become reality.

Far too little thought has been given to legal and economic ramifications of these grand constitutional proclamations. Take the proposed creation of European citizenship together with the prohibition of discrimination on the basis of national citizenship. Both were implicit in earlier treaties and are central to the European idea: Europeans have joined together and should not discriminate against each other. But the new draft would give these principles the status of constitutional law. If applied to other "rights" enumerated in the document, such as social cohesion and social protection, they could create social harmonisation by the backdoor. That would have grave consequences for the European economy.

Under the current principle of inclusion, any EU citizen who moves from one EU country to another to work is immediately and fully integrated into the social system of the host country. The EU migrant pays taxes and social insurance contributions and together with his family receives access to all the state benefits available to domestic employees. A migrant worker with a below-average income profits from the income redistribution of the welfare state just as a national does. According to the calculations of the Ifo Institute, the net benefit that Germany has been granting amounts to €2,300 a year in the first 10 years. By restricting benefits to working migrants the cost may be limited. Those who migrate for reasons other than employment receive no welfare benefits apart from emergency health care. However, the current draft constitution could mean that the inclusion principle would apply to *all* migrants from EU countries. This is not stated explicitly. But the draft includes no restrictions on the rights, so the courts would probably interpret the concept of social inclusion even more generously than they do already.

Current problems with the principle of inclusion will only be amplified. If having work is no longer required before immigrating to a welfare state, the flood-gates will be opened. Masses of poverty refugees would move from eastern European countries to seek their fortune. To prevent this chaos, EU migrants should have to wait for full welfare benefits, such as rent subsidies and public housing, while enjoying access to public services and other benefits they pay for via taxes and social insurance contributions. If differential treatment of this sort is not allowed, governments will be forced to compete to trim welfare benefits so that they are no more attractive as destinations than their neighbours. Traditional welfare states would not survive.

Harmonisation of social standards could prevent a downward spiral. But economic conditions are far too varied for this to work. In all eastern European countries, wages are less than one third of German social welfare assistance, and even in some Spanish, Portuguese and Greek regions, wages are less than half of German social welfare assistance. Harmonising welfare at a level still acceptable to western Europe would lead to the deindustrialisation of whole regions in the south and east.

* Published as "There is no European Right to a Place in the Sun", *Financial Times,* Feburary 13, 2003, p. 11; see also "Zwanzig Mezzogiornos", Financial Times Deutschland, February 13, 2003, p. 30.

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The economic pain would then have to be eased by large fiscal transfers between governments. Theoretically, this is possible. Indeed, the draft constitution provides for such social cohesion. But the results could be disastrous. Look at Germany and Italy. The German government contributed to east Germany's lack of competitiveness by offering western welfare payments which pushed wages above productivity. Similarly, the Italian social system has prevented wages in southern Italy from falling to a competitive level. Consequently, both eastern Germany and the Italian Mezzogiorno suffer from mass unemployment. Productivity is stuck at only 60 percent of the other regions. And they are dependent on vast financial transfers.

It would be unwise to impose the Italian-German model onto Portugal, Spain, Greece, eastern Poland, Slovakia, Romania or Bulgaria, but this is precisely what a European social union would do. There would not be two but twenty Mezzogiornos in Europe if the non-discrimination planned in the draft constitution were applied without restrictions to social benefits for all EU citizens.

Corrections to the Draft Text of the Articles of the Treaty Establishing a Constitution for Europe

This note contains proposed amendments and corrections of the first 16 articles of the constitution as drafted by the Convention on the Future of Europe.

New passages are in bold letters, cancelled passages are crossed out.

Titel 1

Article 3: The Union's objectives

(2) The Union shall work for a Europe of sustainable ~~development~~ **prosperity and stability** based on ~~balanced economic growth~~ **the protection of property rights, economic freedom, the division of labour** and social justice, with a free single market, and economic and monetary union, aiming at full employment and generating high levels of competitiveness and living standards. It shall **remove obstacles to** ~~promote~~ social cohesion **and promote** economic cohesion, equality between men and women, ~~and~~ environmental ~~and social~~ protection and ~~shall develop~~ scientific and technological advance. ~~including the discovery of space.~~ It shall encourage solidarity between generations and between States, and equal opportunities for all.

Comments

Economic growth cannot be guaranteed by anyone, let alone a constitution. The protection of property rights, economic freedom and the division of labour are the cornerstones of a market economy and they need the irrevocable legal support that only a constitution can provide.

Social cohesion is desirable, but removing obstacles is all the EU needs to do since market forces by themselves will bring about rapid cohesion. There is an optimal cohesion speed, and government interventions aimed at increasing the speed of social cohesion are more likely to harm than to help the economies involved. East Germany is the striking example. Policy measures to promote economic

cohesion such as support for local infrastructure can be defended. However, measures to directly promote social cohesion and protection are counterproductive. They are extremely costly, result in mass unemployment and slow down the speed of economic cohesion.

The discovery of space is too specific for a constitutional goal. This smells after transfers to the European Space Agency in Paris.

(3) The Union shall constitute an area of freedom, security and justice in which its shared values are developed and the richness of its cultural **and social** diversity is respected.

Comment

In connection with article 16, the amendment reduces the risk of social harmonisation.

Article 7: Citizenship of the Union

(2) Citizens of the Union shall enjoy the rights and be subject to the duties provided for in this Constitution. They shall have:

- the right to move and reside freely within the territory of the Member States;
- **the right to use the public infrastructure as well as the security and legal protection in their Member State of residence under the same conditions as nationals of that state;**
- **the right to work and the duty to pay taxes and fees as well as the right to participate in contribution-financed social security systems in their Member State of residence under the same conditions as nationals of that state;**
- the right to vote and to stand as a candidate in elections to the European Parliament and municipal elections in their Member State of residence under the same conditions as nationals of that State;
- …

Comment

Full social inclusion would be a major problem for Europe triggering off mass migration from the new member countries, imposing high fiscal burdens on the target countries and eventually eroding the European welfare state. Rather than restricting the non-discrimination clause of Article 6, the enumeration of migrants' rights makes it possible to exclude the constitutional right to receive tax financed social benefits and be a net recipient of government resources, even if nationals enjoy such a right. The exclusion makes it possible for a state to prevent welfare shopping. Proposals to delay the full inclusion of migrants in the redistributive activities of the state in some initial period after their entry become possible. (See Scientific Council of the German Ministry of Finance, Freizügigkeit und Soziale Sicherung in Europa (Economic Freedom an Social Security in Europe), Bundesministerium der Finanzen, Berlin 2001, as well European Economic Advisory Group at CESifo, Report on the European Economy, Chapter 3: "Rethinking Subsidiarity in the EU: Economic Principles", p. 76–97, Munich 2003.)

Article 12: Shared competences

(4) Shared competence applies in the following principal areas:

- internal market
- area of freedom, security and justice
- ~~agriculture and~~ fisheries
- ~~international~~ transport
- trans-European networks
- ~~energy~~
- ~~social policy~~
- economic ~~and social~~ cohesion
- environment
- public health, and
- consumer protection.

Comments

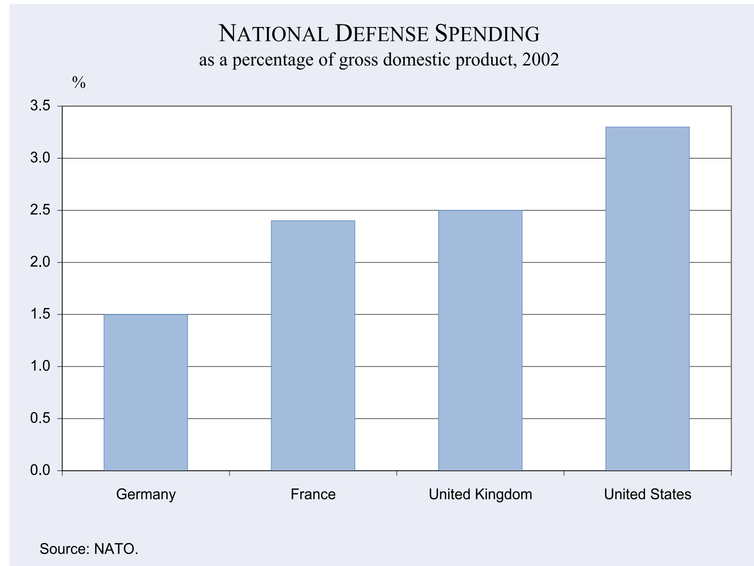
Agriculture certainly is not a policy area with international spill-over effects that could justify EU action, despite the obvious vested interests of some countries.

Transport is an EU issue only to the extent that it is international.

Energy is of no concern for the EU. Energy is a normal private good which is efficiently allocated via the market process. There is no need to single it out relative to other goods.

For the reasons explained above, social policies and social cohesion do not belong to the set of EU policies.

Germany's Military in Need of Modernisation



Even if Germany had agreed to take part in the war on Iraq, experts say it would not have been able to do so for lack of modern equipment.

Germany, like other NATO allies, must transform its traditionally static armed forces into mobile, high-tech services. But, like most other NATO allies, Germany has neglected defence spending since the end of the cold war.

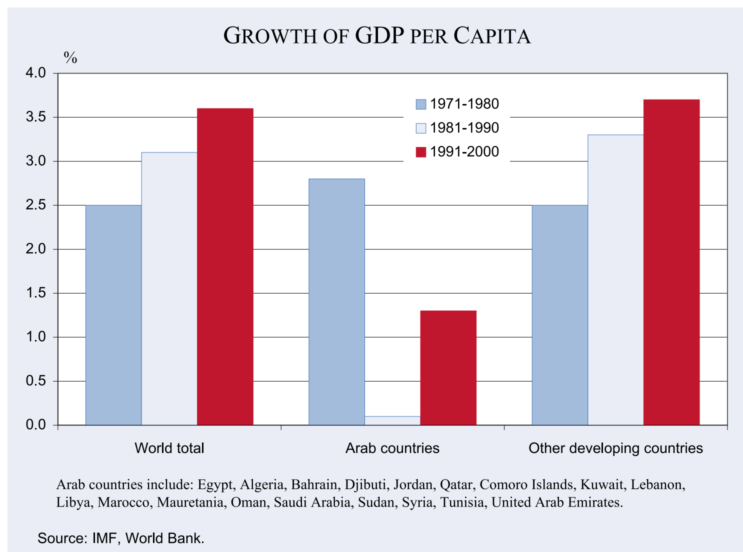
While the United States spends 3.3 percent of its gross domestic product on its armed forces, Germany's military spending last year totalled just 1.5 percent of GDP. According to NATO, half of the country's defence budget goes to salaries and benefits for personnel and only 13 percent is spent on new equipment. Capital investment must be raised to at least 30 percent, however, in order to modernise at the necessary pace, says General Naumann, a former chairman of NATO's military committee. The idea is to close military bases and cut back personnel, a third of which are civilians. This is meeting stiff resistance of the labour unions as well as the mayors of the towns which host the bases and have become dependent on them for their livelihood.

The cost of absorbing former Communist East Germany, which is still getting huge transfers every year to support the excess of its consumption over output, an ever expanding welfare state and rising unemployment payments in a slow- growth economy have put severe constraints on the German budget. And with a budget deficit already exceeding the Maastricht limit of 3 percent of GDP, deficit spending on modernising military equipment is just not in the cards.

Yet, Germany has been generous and effective in peacekeeping operations from the Balkans to Afghanistan, where it now shares command of the international force in Kabul. It has several hundred highly trained special operations troops, excellent mine-clearing and water purification equipment, ABC detection tanks as well as a strong medical corps and state-of-the-art flying hospitals. All in all, it has more troops deployed abroad than any other country besides the United States.

H.C.S.

Does Islam Retard Economic Growth?



It is still an open question whether Islam has a retarding effect on growth in the Arab countries or whether the general economic slowdown, oil market developments, the regional security situation, and country-specific policy pressures exert a greater influence.

It is a fact, however, that the standard of living in the countries of the Near East is hardly higher on average than in many developing countries – despite their oil wealth. Thus in 2000, average per capita income of the Arab countries amounted to around $4,700 while in the other developing countries it was about $4000. World-wide, GDP per capita averaged about $7,500.

The average figure for the Arab countries hides wide divergencies, however. Thus in Qatar, GDP per capita is around $19,000, while it just reaches $900 in Yemen.

GDP per capita, $PPPs, 2000

Qatar	18,789	Algeria	5,308	Mauretania	1,677
United Arab Emirates	17,935	Lebanon	4,308	Comoro Islands	1,588
Kuwait	15,799	Jordan	3,966	Yemen	893
Bahrain	15,084	Egypt	3,635		
Oman	13,356	Syria	3,556	Arab countries	4,728
Saudi Arabia	11,367	Marocco	3,546	Other developing countries	3,933
Libya	7,570	Djibuti	2,377		
Tunesia	6,363	Sudan	1,797	World total	7,473

Source: UNDP

A look at economic growth during the past three decades explains why the Arab countries are lagging the rest of the world. During the 1980s, GDP per capita did not grow at all and during the 1990s it only grew by 1.3 percent. At the same time, GDP per capita climbed more than 3 percent p.a. worldwide. The last time the Arab countries were able to keep pace with the rest of the world was in the 1970s when surging oil prices pushed up their standard of living.

Their great dependence on oil has not allowed these countries to benefit from rapid globalisation. Whereas world trade almost tripled during the past twenty years, Arab exports not even held their own.

Economic performance is not the only measure of well-being, however. According to the UN Human Development Index, illiteracy is one of the major problems of the Arab population – although literacy is an essential prerequisite for participating in the prosperity of an increasingly knowledge-based world. If the definition of well-being is extended to other areas like political freedom, use of the Internet, and women's participation in political and economic life, the Arab countries fall back further in the development ranking.

H.C.S.

World Economic Survey*

World Economy: Downward Trend Stopped?

In January 2003 the world economic climate as reported by the latest World Economic Survey improved slightly. But at 85.9 (1995 = 100) it is still significantly below its long-term average (94.1 in the period 1982 to 2002), though slightly higher than the revised figure of the previous survey (83.2). The little brighter economic climate is solely attributable to the somewhat improved expectations for the next six months, whereas the assessment of the current economic situation, the other component of world economic climate, remained negative and has not changed since October 2002.

Given the geopolitical uncertainty at the time of the survey, we dare not interpret the modest improvement of the world economic climate as a clear sign of an imminent worldwide recovery. It cannot be ruled out that the downward trend has only temporarily been interrupted. The April survey will provide the additional evidence.

World economy: Slight improvement of economic climate

The downturn of the world economic climate indicator, which had accelerated in the period from August to October 2002, reversed in January 2003 (see Figure 1). The slight improvement of the overall climate indicator resulted exclusively from somewhat more positive expectations for the coming six months, whereas the current economic situation remained at the low October 2002 level. The capital investment sector is still performing worse than the consumption sector.

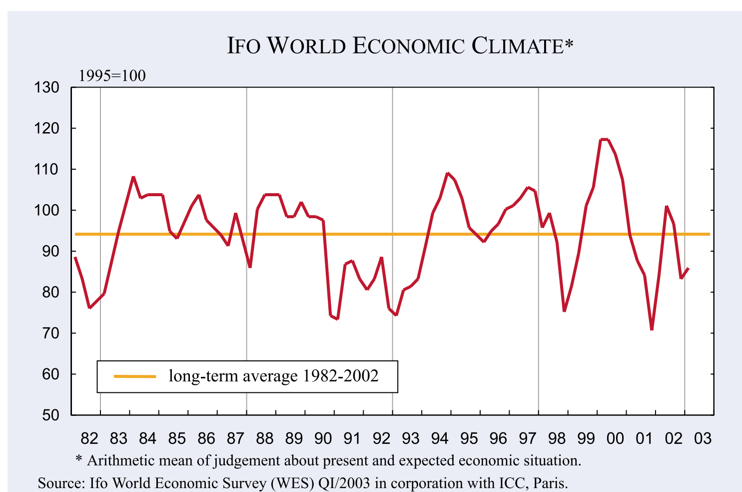
United States: Slight improvement of economic climate

After a setback of the economic climate in the fourth quarter of last year, a slight improvement was recorded in January 2003. Both the assessment of the present economic situation as well as the expectations for the next six months point upwards, although the present economic situation is still regarded as less than satisfactory. This is mainly due to the still unsatisfactory level of the hard-hit capital expenditure sector which is, however, expected to improve within the next six months, giving rise to the hope for a brighter outlook for the entire economy (see Figure 2).

European Union: Downward trend of economic climate halted

In contrast to the world average, the climate indicator in Western Europe has stalled rather than risen since the October 2002 survey. This stagnation results from a more negative assessment of the present economic situation, whereas the expecta-

Figure 1

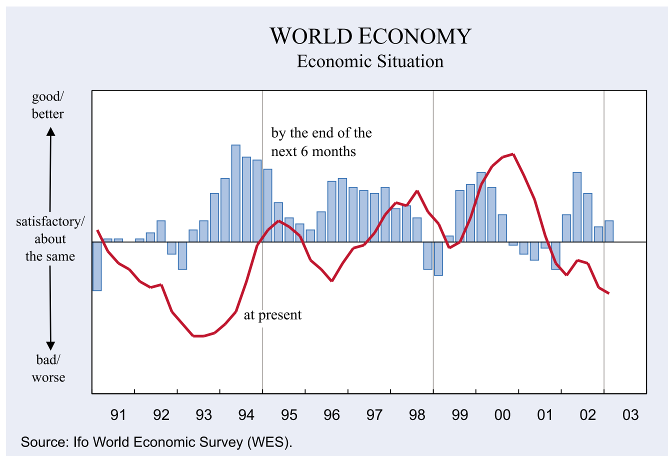


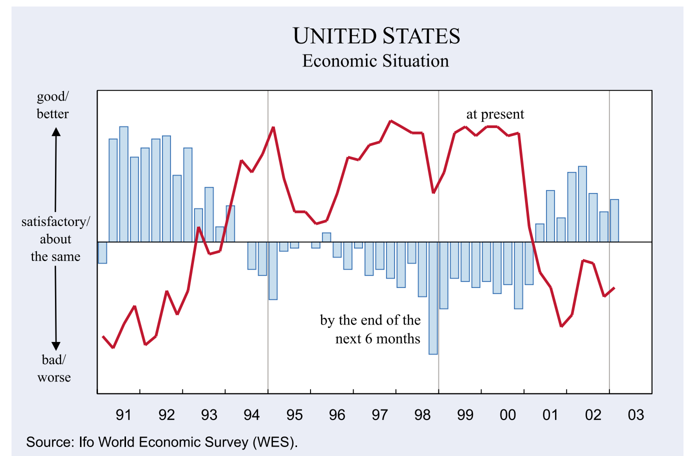
* Arithmetic mean of judgement about present and expected economic situation.

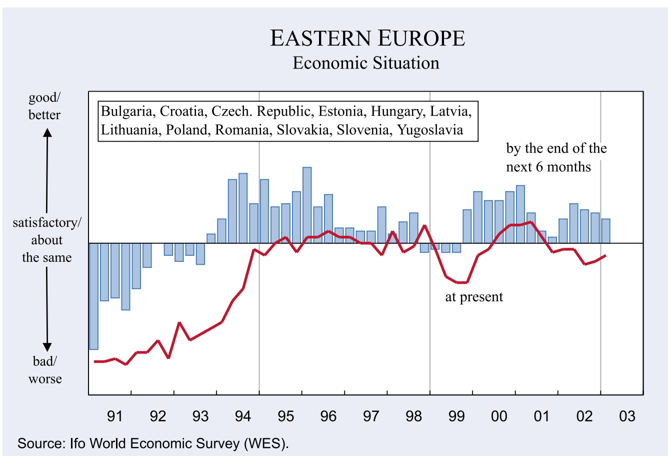
Source: Ifo World Economic Survey (WES) QI/2003 in corporation with ICC, Paris.

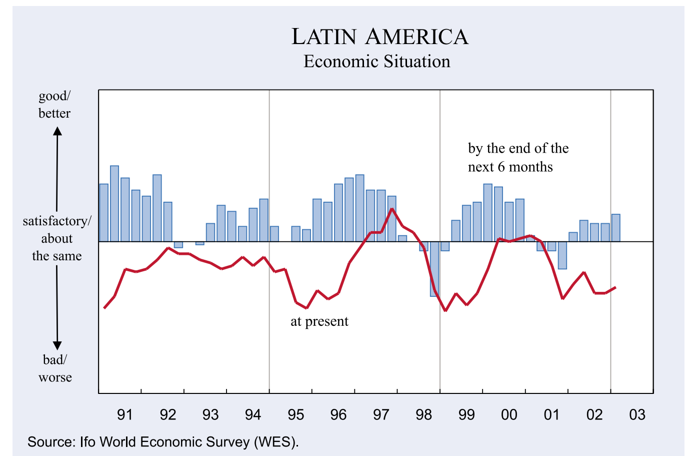
* The survey is jointly conducted by the Ifo Institute and the Paris-based International Chamber of Commerce (ICC).

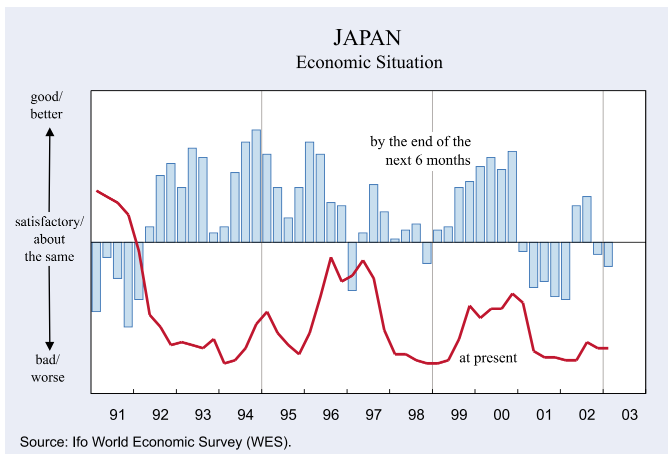
Figure 2

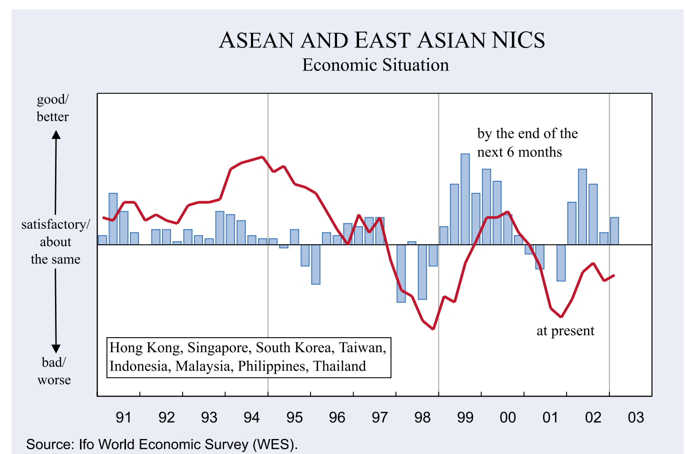












tions for the coming months have improved slightly since the October 2002 survey (see Figure 3).

Among the euro area countries only *Finland, Spain* and *Ireland* assess the present economic performance as satisfactory or good. The economic expectations in Finland also remained optimistic, probably due to the high level of private consumption and a continuation of favorable export growth expected in coming months. In *Ireland* and *Spain* the economic performance is expected to remain on a satisfactory level in the next six months.

As in the previous survey, *Germany* again shows the lowest level by far of assessments of the present economic situation and together with *Austria, Portugal, Italy* and the *Netherlands* is in the bottom group of EU countries. However, there is some hope for the second half of the year: WES experts see signs of an economic recovery in the next six months particularly in *Italy* and *Germany*, where the prospects for exports are positive. In the other countries, the short-term expectations are moderately positive, although they do not really raise hopes for a reversal of the negative trend.

WES experts in *France* and *Belgium* assessed the present economic performance as poor, whereas the expectations remained positive for the next six months.

The non-euro area countries *Denmark, United Kingdom* and *Norway* appear to be faring significantly better economically than the other European countries. Only in *Sweden* did the current economic situation deteriorate slightly, though remaining close to the satisfactory level. On the other hand, in *Norway* the economic expectations for the next six months are worse than the euro area average. In the *United Kingdom* the economic development is still characterised by falling exports, and a further deterioration of the trade balance is expected in the next six months.

Eastern Europe: Stabilization of economic climate continues

According to the WES experts in Eastern Europe, the current economic situation has improved slightly since the October 2002 poll. On average, the outlook remained mostly unchanged, reflecting the general uncertainty concerning the future of these economies.

The current economic situation continues to be good particularly in the Baltic countries *(Estonia, Lithuania* and to a lesser degree *Latvia)* and in *Slovenia*. Expectations for the next six months also remained bright.

Economic activity in Croatia continues to be on an upward trend and is assessed as almost satisfactory. The prospects for the next six months remain highly positive. Similarly in *Bulgaria*, the assessment of the present situation improved considerably. To a lesser degree this holds true also for the *Czech Republic*, where the economic situation is now regarded as satisfactory. However, the economic outlook for the *Czech* economy appears to be clouded; growth of capital expenditures, private consumption and exports is expected to slow down in the course of the next six months.

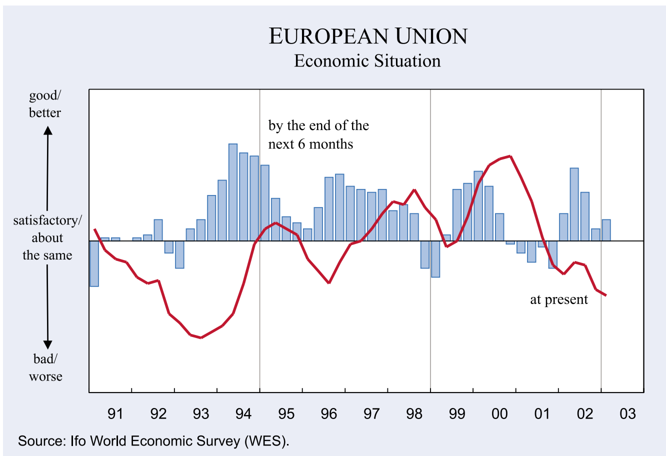
In *Poland, Romania* and *Yugoslavia* the present state of the economies remained clearly below the "satisfactory" level but is expected to brighten somewhat in the course of the next six months. The reason for the optimistic forecast is probably the more buoyant consumption sector in these countries, which is also expected to grow during coming months.

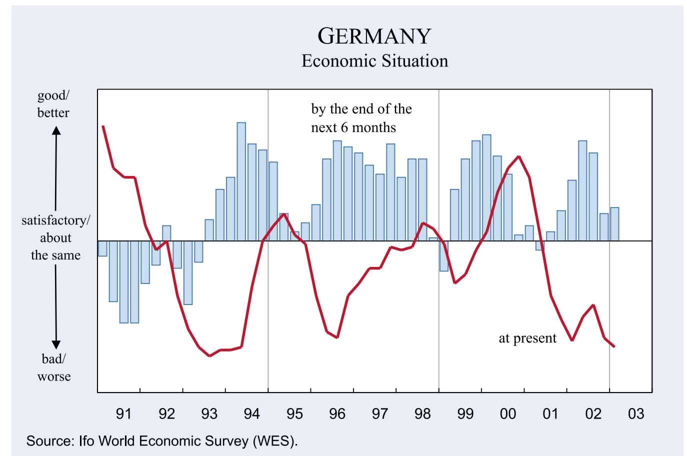
Latin America: Current economic situation still unsatisfactory

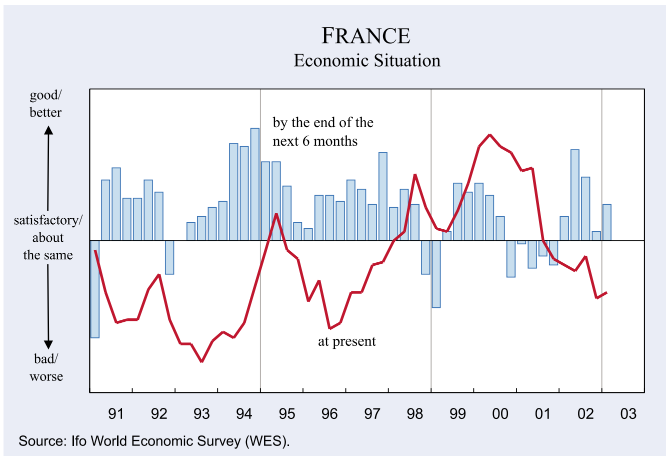
Brazil, Chile, Peru, Costa Rica and *El Salvador* currently show the relatively best economic performance – judged as almost satisfactory. Economic expectations became highly positive particularly in *Brazil, Chile, Peru* and *El Salvador*, which is also reflected in a relatively optimistic view on the future trend of capital expenditures, consumer outlays and exports.

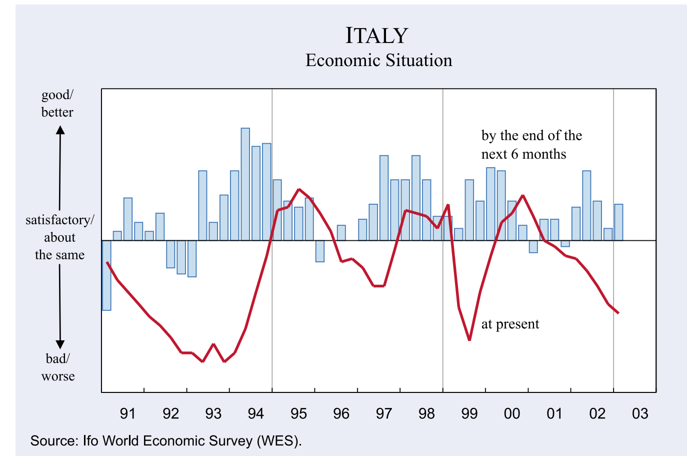
In *Argentina* the present economic performance still remains at a very low level. However, the expectations for the next six months have improved somewhat. Especially the export sector in *Argentina* is expected to pick up in the coming months. In *Uruguay* and *Paraguay* the current economic performance is also rated as poor but is expected to improve in the near future. In *Panama* and *Mexico* the economic situation remains clearly

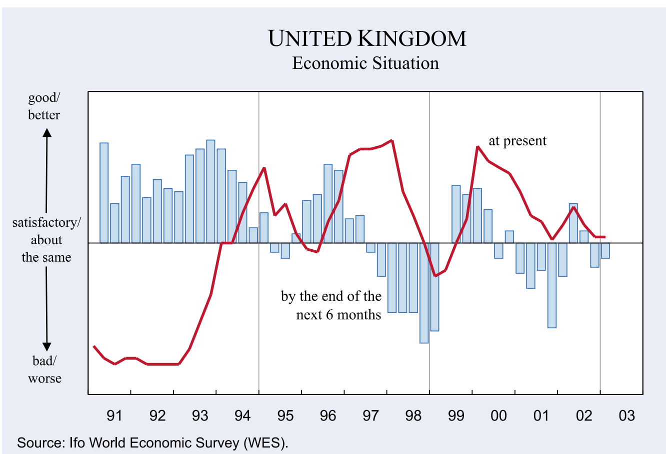
Figure 3

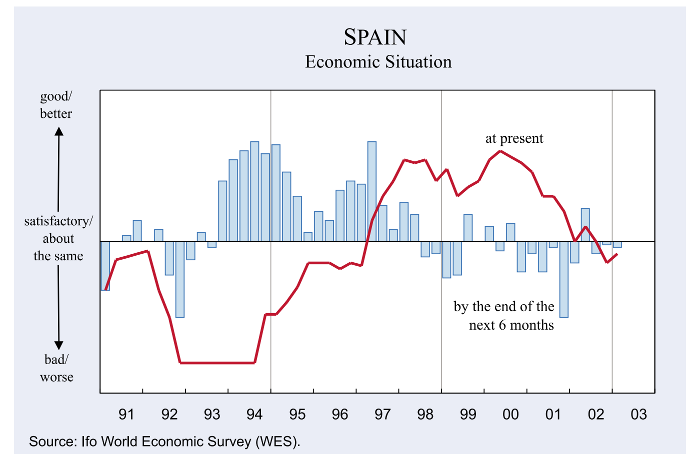












below the "satisfactory" level. However, in both cases expectations are positive.

In summary, almost all countries in Latin America expect the overall economy to strengthen in the coming months, accompanied by more dynamic growth of capital expenditures, private consumption and exports. The only exception, according to the WES experts, is Venezuela where the current economic situation is rated as very poor and is expected to deteriorate further during the next six months.

Asia: Somewhat better economic climate

According to the latest survey, the assessment of the current economic situation remained unchanged while expectations for the next six months improved. Compared with the previous survey, the overall economic climate indicator for Asia slightly improved but still remained below its long-term average.

In *Japan*, the economic climate remains subdued. The assessment of the current economic situation is in line with the negative expectations of last quarter and is well below the "satisfactory" level. The short-term expectations also point to further deterioration (see Figure 2). The less optimistic forecast for the next six months is probably related to the fact that WES experts there do not expect a significant recovery of private consumption that could end the deflationary trend in the country. Only Japan's export sector is providing some growth impetus.

The economic situation of *South Korea* was rated as more than satisfactory in January. This was also true of Thailand where private consumption increased in recent months and is expected to remain buoyant in the course of the next six months. The economic climate in *Indonesia* is still rough, however.

In *Taiwan*, assessments of the present economic situation were slightly worse, whereas more dynamic economic growth than in the recent past is seen ahead. In the *Philippines* the present economic situation remained slightly below satisfactory, but expectations for the next half year improved and are now close to the Asian average. While the economic situation of *Singapore* deteriorated in past months, it is expected to improve. *Hong Kong* again showed a considerably weak economic performance which is reflected in the low level of assessments of the present economic situation, and no significant change for the better is expected for the next six months.

Near East: Economic climate improved slightly

The overall assessment of the current economic situation in the Near East remained close to the satisfactory level. By far the best economic performance is shown by the *United Arab Emirates,* followed by *Saudi Arabia* where the outlook for the coming six months – like the average for the Near East – signals an improvement in economic activity. The economy of *Bahrain* was rated as satisfactory, though expectations for the next six months are clouded. The recent economic situation in *Iran* and *Jordan* is expected to remain at a satisfactory level. *Turkey's* current situation slightly improved, although still remaining well below satisfactory. However, the expectations for the next six months are clearly positive. *Israel* continues to suffer from political and economic crisis; WES experts don't expect a noticeable improvement in the next six months, although they see a chance for export growth.

Interest rates: Trend of falling short-term interest rates expected to slow

The phase of declining **short-term interest rates** is expected to level off in the course of the next six months. In *North America* – in the *United States* as well as in *Canada* – no further cuts are expected. Rather, short-term rates are expected to pick up slowly in the course of the next six months. A stabilisation or even a slight increase in rates appears to be also likely in *Australia* in the coming months. In Asia and particularly in *Western and Eastern Europe* the downward trend of short-term interest rates is still intact and is expected to continue in the coming months. In *Latin America* expectations of rising short-term interest rates still prevail, though the trend is not uniform: In countries like *Brazil, Peru, Bolivia, Ecuador* and *El Salvador* short-term rates, according to WES experts, are likely to decline in the coming months, whereas in most other Latin American countries, including *Argentina, Mexico* and particularly *Venezuela*, a

further increase of short-term rates appears to be more likely.

Long-term interest rates are expected to remain stable or increase marginally in the course of the next six months. This picture characterises in particular the situation in Western Europe, whereas an upward trend of long-term interest rates is expected in North America and *Australia* as well as in some Latin American countries like *Argentina, Mexico* and *Venezuela* and in some Asian countries like the *Philippines* and *Vietnam*. On the other hand, a continued downward trend of long-term interest rates will prevail, according to WES experts, in most Eastern European countries and some Asian countries like *China, India, Pakistan, Taiwan* and *Thailand*.

World currencies seen relatively close to equilibrium

On average of the 90 countries polled, only the British pound sterling is still judged to be overvalued. The US dollar appears to be only slightly higher than justified on fundamental grounds. For the first time, the euro is regarded as slightly overvalued. The current level of the Japanese yen is assessed as appropriate by the vast majority of WES experts.

In Western Europe, *Canada* and *Australia* the US dollar is still seen as overvalued against own currencies, though to a lesser degree than in the previous surveys. WES experts in Eastern Europe consider the major world currencies close to "fair value" against their local currencies, except *Poland, Slovenia* and *Slovakia*, where the experts rated the US dollar and the euro as being clearly overvalued against local currencies. In Latin America, the US dollar as well as the euro and the British pound are judged as somewhat overvalued, whereas the yen is seen to be near "fair value". This trend is particularly pronounced in *Argentina* and *Brazil*. In *Mexico, Guatemala, Costa Rica* and *Peru* local currencies are still seen as overvalued in relation to the major world currencies.

In addition to the general assessment, WES experts again were asked about the likely trend of the US dollar exchange rate in the next six months. On average for all 90 countries, the US dollar is expected to remain unchanged. Views differ strongly, however. In Western Europe as well as in *Canada* and *Australia* the US dollar is expected to devalue further, whereas in the majority of *CIS* countries, *Russia* included, the US dollar is expected to gain strength. The same holds true for most countries in Latin America, the Near East and Africa.

Inflation: Expected to remain at the same level

World-wide consumer price inflation in 2003 is expected to average 3.2%, identical to last year's inflation rate. In Western Europe as a whole and specifically in the euro area, the January survey sees the 2003 inflation rate remaining at last year's level of 2.2%. However, inflation differentials are still quite large across European countries – about half of the countries within the euro area (namely *Austria, Belgium, Finland, France, Luxembourg* and *Germany*) are expected to meet or fall below the 2% mark, whereas the remaining countries *(Greece, Ireland, Italy, the Netherlands, Portugal* and *Spain)* will again exceed the ECB's target. With some exceptions, the higher inflation rate in the second group of countries is largely due to stronger productivity growth in the process of catching up to the productivity levels of the industrialized countries in the first group. As this process of relative price adjustment will go on for some time, the present ECB inflation target of below 2% appears to be too stringent. As pointed out by the latest report of the European Economic Advisory Group at CESifo, it would be preferable to raise the medium-term average inflation target to 2.5%.[1]

The 2003 inflation expectations for the *United States*, at 2.2%, are again within the range regarded as normal by the US Fed (around 2.5%), which puts equal weight on price stability and economic growth.

Asia continues to show by far the highest degree of price stability, though this year's expected inflation rate is moving up a bit (1.5% compared to 1.1% in October 2002). Deflationary trends still prevail in *Japan* (– 0.6% in 2003 compared with – 0.8% in 2002) and *Hong Kong* (– 0.7% in 2003 compared with – 2.1% in 2002). In *China* and *Taiwan*, inflation is expected to pick up marginally (from 0.7 in 2002 to

[1] European Economic Advisory Group at CESifo (EEAG), Report on the European Economy 2003, published by the Ifo Institute for Economic Research, 2003, p. 4.

presumably 1.1% in 2003), though there is still some danger of getting into a deflationary spiral.

The inflation outlook for Central and Eastern Europe has decreased from 5.3% in 2002 to 4.7% in 2003. The only countries in this bloc still having very high inflation rates are *Yugoslavia* (9.3% expected this year compared with 17.3% last year) and *Romania* (14.3% compared with 21.2% last year).

Inflation rates are also expected to decline further in Central and South America (from 12.5% in 2002 to 9.6% in 2003), although some countries are moving against this trend and expect rates to rise. The greatest changes have been recorded in *Venezuela* (from 34.5% in 2002 to 45.0% in 2003); whereas in other countries the expected acceleration of inflation is more modest: in *Brazil* (from 8.6% in 2002 to 10.1% in 2003), in *Paraguay* (from 15.0% to 17.0% in 2003) and in *Uruguay* (from 26.6% to 29.7% in 2003). Some success in fighting inflation is reported from *Argentina*, where the inflation rate of 62.3% in 2002 is expected to slow to about 26% in 2003.

Special question: How big is the threat of worldwide deflation?

The special question asked this time focused on the "D" word, the threat of deflation, meaning sustained decreases in prices across the entire economy. The question was split into two parts: The first part dealt with the threat of global, i.e. worldwide recession. The second part focused on the specific country or region the WES expert is reporting from.

An obvious example of country-specific deflation is *Japan* in the 1990s when the economy moved into a phase of sustained deflation which was caused by the collapse of the stock market and the burst of the real-estate bubble at the end of the 1980s. It was aggravated by the lack of appropriate monetary and fiscal policies and by the postponement of necessary structural reforms.[2]

Is the *Japanese* case of deflation only an isolated "accident" or do we also have to face problems of this type in other regions or even worldwide? This was the reason for asking the "D" question in this survey.

About one quarter of approximately 1,100 WES experts in 90 countries assess the threat of a local deflation in their particular region as very realistic. Amongst them, 14% report that deflation is already a problem in the country they cover and another 11% see a strong possibility of the outbreak of deflation. The worldwide average is strongly influenced by the answers from Asia, where about half of the respondents assess deflation as an imminent threat. In other parts of the world, the share of respondents fearing deflation in their region lies between 3% and 22%, with the CIS and Africa marking the lower end and the Near East the upper end of this range. In Western Europe this percentage is only 13% and thus lower than in North America (20%) and the world average (25%). Within Western Europe the share is particularly high in *Germany* (about 30%). The share in the Near East (22%) is mainly influenced by responses from Israel. On the other hand, as the economies in Latin America and Africa are more frequently struggling with high inflation, the risk of deflation is not seen as very great (8% and 9% respectively).

Economic experience shows that the behaviour of entrepreneurs and consumers is not only influenced by the assessment of risks in their own countries and regions but increasingly also by the assessment of global risks. And here deflation appears to be a major threat to the global economy, with 45% of all WES experts surveyed worldwide thinking that global deflation is possible, though only 5% speak of a "strong" possibility. A breakdown by region shows that WES experts in Asia (68%) and the Near East (67%) are much more worried about the spread of deflation worldwide than the others. Particularly in Asia, this can be explained by deflationary experience in the region; in the Near East the pronounced economic problems in *Israel* and *Turkey* obviously have influenced the rather pessimistic view of likely developments in the world economy.

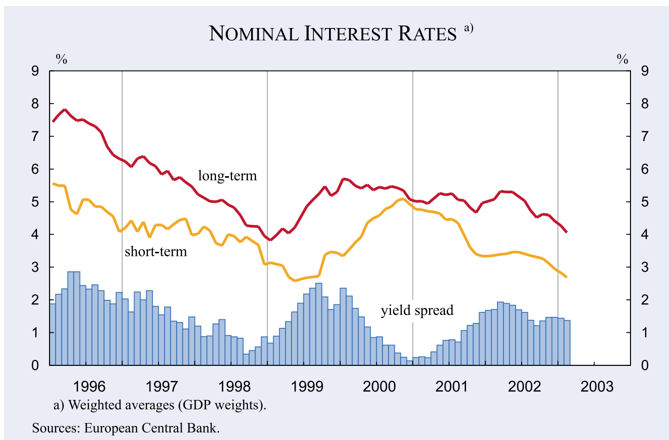
Which conclusions may be drawn from this? The widespread fear of deflation at the global level but also the more isolated problems in specific countries or regions should be taken seriously by economic policymakers. Self-fulfilling prophecies can become a problem. The Fed study on what went

[2] See e.g., Alan Ahearne et al., "Preventing Deflation: Lessons from Japan's Experience in the 1990s", International Finance Discussion Papers, Number 729, June 2002, Board of Governors of the Federal Reserve System, USA.

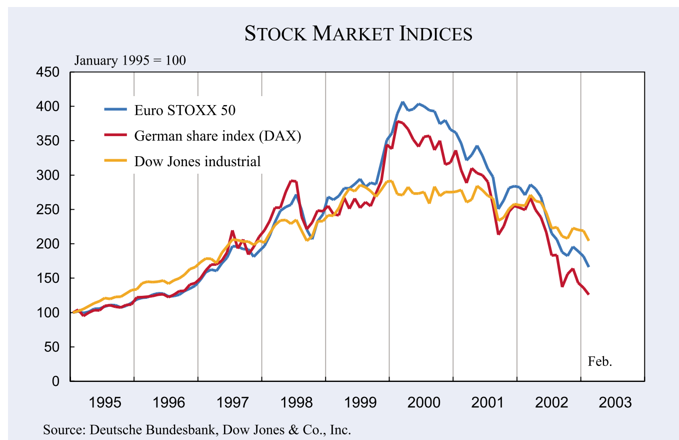
wrong in *Japan* gives advice on how the spread of the Japanese disease may be avoided.

The Japanese case shows that deflation can be very difficult to predict. For that reason monetary policy must provide sufficient insurance against downside risks through a precautionary easing of monetary policy. The costs of excessive monetary easing appear to be relatively low compared to the costs of entering into deflation. Should monetary policy prove to have been overly expansionary, a correction will cause much fewer problems than the move from excessive restriction to more expansion should a deflationary process already have started. In an advanced stage of deflation, consumers and entrepreneurs come to expect price declines and thus will postpone purchases in order to benefit from the expected price reduction. On a global level, widespread postponement of purchases aggravates the weakness of the economy and the increase of unemployment. The result would be a deflationary spiral. Fortunately we are far from this point. As the recent WES results have shown, relatively few experts assess deflation as a strong possibility for a specific country, with the exception of Asia and Japan in particular. However, in the assessment of the worldwide risk of deflation on a more general level, the respective share of experts is significantly larger. In order to avoid self-fulfilling expectations, monetary policy is well advised to display an easing bias. Only after the Iraq crisis will have been resolved, after investor and consumer confidence will have strengthened and world economic growth will have gathered more steam should central banks cautiously absorb any excess liquidity.

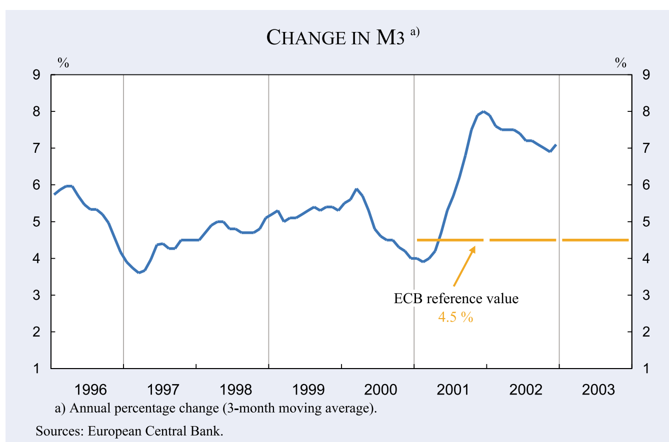
Financial Conditions in the Euro Area



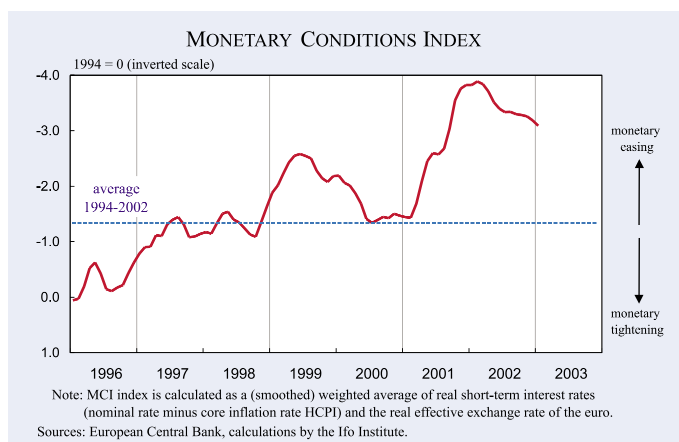
Short-term interest rates have continued to decline in line with the latest cut to 2.5% of the ECB's rate on main refinancing operations effective March 12. Bond rates have declined in parallel, leaving the yield spread almost constant.



The turnaround of stock prices in November 2002 was short-lived. Stock prices have declined as the Near East crisis deepened. The End of the Iraq war may initiate a permanent turnaround of stock prices, however.

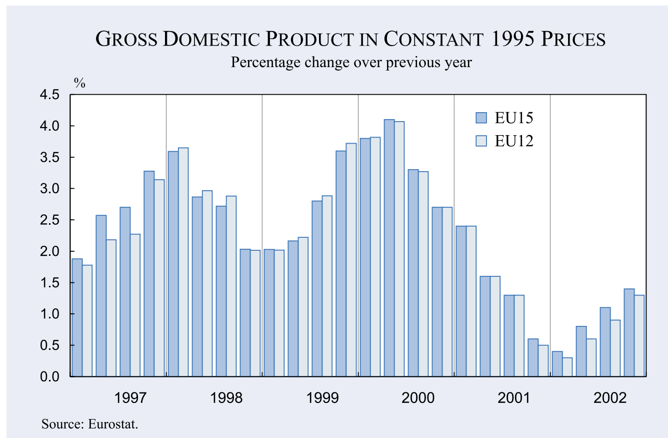


The money stock M3 had declined to just below 7% following its peak in December 2001 – still far above the ECB target of 4.5%. In January the annual rate of growth of M3 rose to 7.4% from 6.8% in the preceding month. The three-month moving average of the annual growth rates of M3 was 7.1% for the period November 2002 to January 2003.



Monetary easing is not evident in the Monetary Conditions Index which also includes the real effective exchange rate of the euro which has offset the decline in short-term real interest rates.

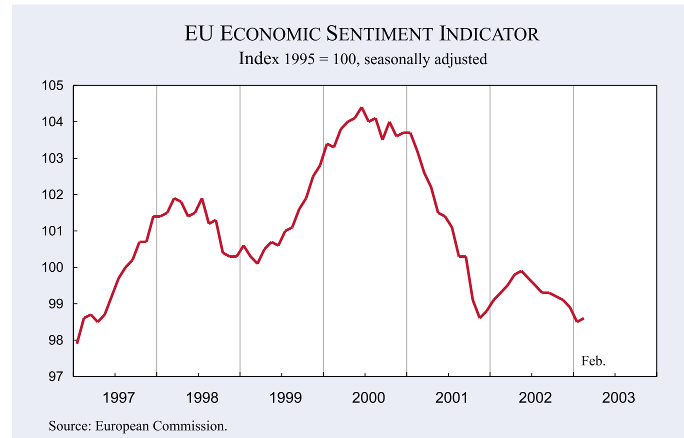
EU Survey Results



GROSS DOMESTIC PRODUCT IN CONSTANT 1995 PRICES
Percentage change over previous year

Source: Eurostat.

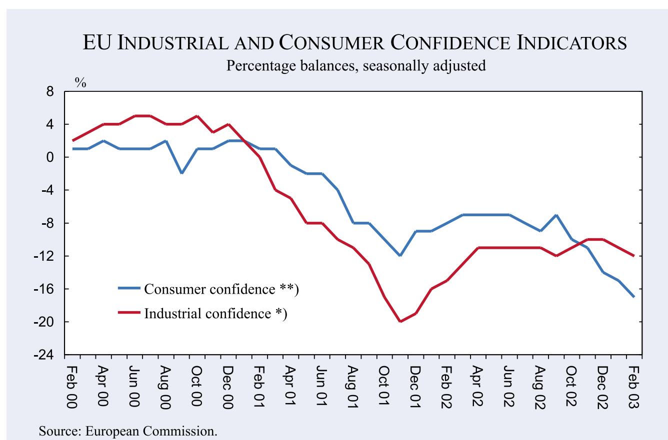
In the fourth quarter of 2002 real GDP continued on its gradual upward trend. The 12 euro area countries recorded growth of 1.3% over the fourth quarter 2001, topped slightly by the 1.4% growth of all 15 EU countries. Compared with the third quarter of 2002, growth in both areas amounted to 0.2%. While private consumption remained relatively strong, investment stagnated and exports weakened. For the entire year 2002, growth is now estimated at 0.8% for the euro area and 0.9% for the entire EU.



EU ECONOMIC SENTIMENT INDICATOR
Index 1995 = 100, seasonally adjusted

Source: European Commission.

The economic sentiment indicator (ESI) for the EU as a whole increased slightly by 0.1 percentage points in February 2003, reaching a value of 98.6, This is the first improvement since May 2002 when it stood at 99.9. The economic sentiment indicator rose in Sweden, Spain, Germany, Austria, Finland, Greece and Italy. It remained unchanged in Denmark and declined in the Netherlands, France, the United Kingdom, Belgium, Ireland and Portugal.

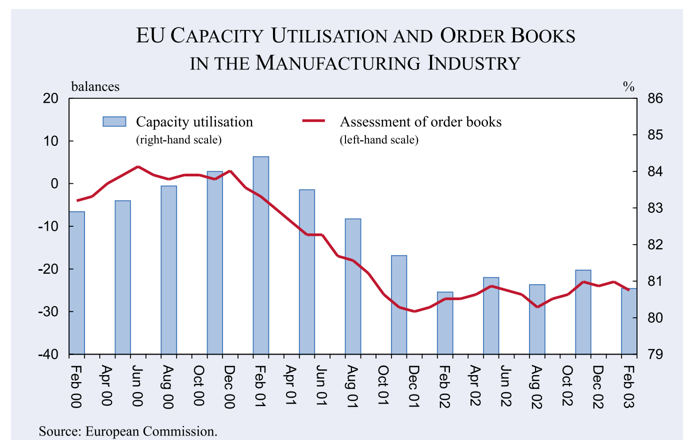


EU INDUSTRIAL AND CONSUMER CONFIDENCE INDICATORS
Percentage balances, seasonally adjusted

Source: European Commission.

* The industrial confidence indicator is an average of responses (balances) to the questions on production expectations, order-books and stocks (the latter with inverted sign).
** New consumer confidence indicators, calculated as an arithmetic average of the following questions: financial and general economic situation (over the next 12 months), unemployment expectations (over the next 12 months) and savings (over the next 12 months). Seasonally adjusted data.

The **industrial confidence indicator** declined, driven by decreases in France, Ireland, the Netherlands, the UK, Italy and Luxembourg. These decreases more than offset the increases registered in Sweden, Finland, Spain, Austria and Belgium. Industrial confidence remained unchanged in Denmark, Germany, Greece and Portugal.
The **consumer confidence indicator** continued the sharp decline which had started last October. The indicator remained unchanged in Ireland and Austria and rose only in Italy. It fell in all other EU countries, led by France, Portugal and Belgium.

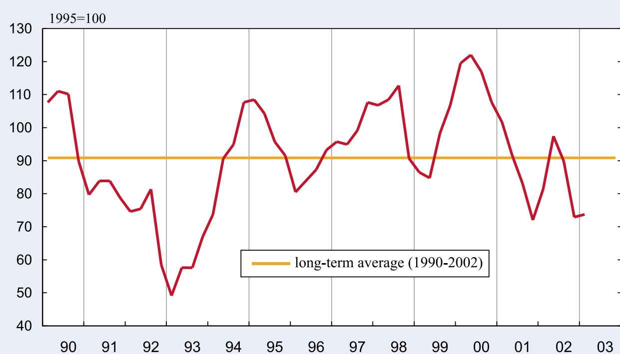


EU CAPACITY UTILISATION AND ORDER BOOKS
IN THE MANUFACTURING INDUSTRY

Source: European Commission.

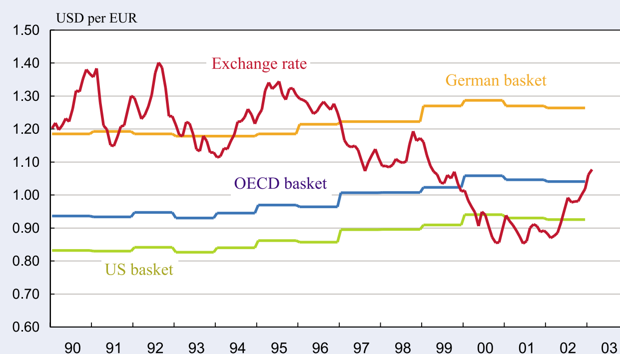
The monthly assessment of order books, – 25 in February, has fluctuated around this level, still signalling insufficient demand. During the most recent quarter, capacity utilisation in the EU declined again to 80.8, after an increase to 81.3 in the preceding quarter, reflecting the disappointing state of the European economy.

Euro Area Indicators



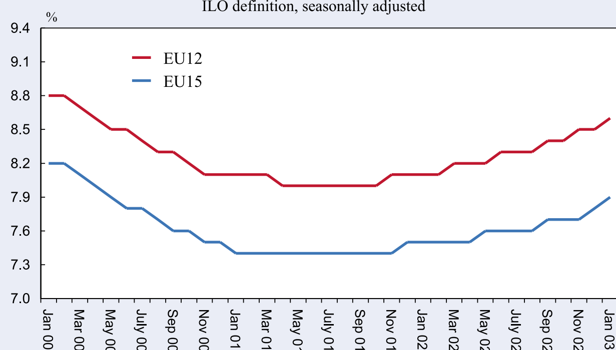
Source: Ifo World Economic Survey (WES) QI/ 2003.

The Ifo indicator of the economic climate in the euro area improved marginally to 73.7 in January 2003 compared with the WES results of October 2002. The improvement resulted exclusively from slightly better expectations for the next six months. The assessments of the present economic situation, the second component of the climate indicator, deteriorated further, reaching its lowest level since the second quarter of 1994.



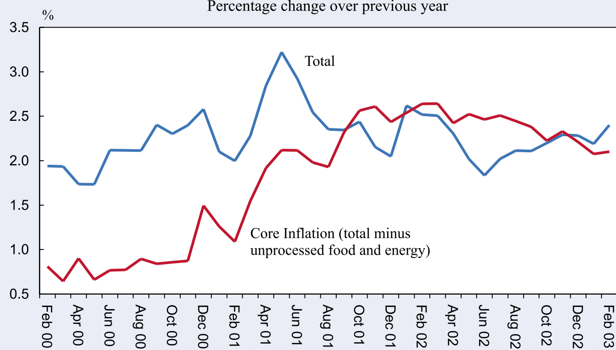
Sources: European Central Bank, Federal Statistical Office, OECD and calculations by the Ifo Institute.

The euro has appreciated against the US dollar since the Spring of 2002. After achieving parity in November, the euro rose to an average of 1.08 US cents in February, slightly exceeding the OECD PPP level.



Source: Eurostat.

In January 2003, the seasonally adjusted unemployment rate continued to rise in Western Europe. At 8.6% in the euro area, it maintained its differential to the unemployment rate in the entire EU which rose to 7.9%.



Source: Eurostat, Ifo Institute.

In February 2003, the rate of inflation of euro area consumer prices accelerated to 2.4%, mainly as the result of higher oil prices. The highest annual rates were recorded in Ireland (5.1%), Greece (4.2%) and Portugal (4.1%); the lowest rates were observed in Germany (1.3%), Belgium (1.6%) and Austria (1.8%). The rate of core inflation, which excludes energy and processed foods, remained almost unchanged.

Prospects for the European Economy – Threats from the Financial Markets

On 20 and 21 March 2003 the CESifo International Spring Conference took place in Berlin. The two-day event brought together economists from around the world to discuss the prospects of the world's major economies and to unveil the threats to sustained growth. Three major issues were discussed: The regional economic outlook, the impact of the turmoil in the financial markets, and trends in major European manufacturing industries. The start of the Iraq war cast a shadow on the conference and there was a discussion of its impact. There was wide agreement that, with a high probability, it will be a short military conflict and that the political situation in the Middle East will not be destabilised. Under these assumptions, the conclusion was that the economic recovery will be delayed. Global growth will remain weak in 2003. Even though, some risks remain for a global recovery which derive from the financial markets. For the major European manufacturing industries, the speakers presented their views on sectoral developments. They shared the expectation of a recovery in the industries concerned, albeit at a pace that will be low compared with previous cyclical upswings.

The downturn of the world economy in 2001 has not led to a V-shaped recovery as had been expected, in particular for the United States, by most of the forecasters. The global recovery has remained tepid and the margin of uncertainty remains unusually large for this stage of the cycle. With reference to this phenomenon, some speakers discussed patterns of the current business cycle, comparing them to previous cycles since World War II (among them Flemming Larsen, IMF; Claudio Borio, BIS). The results disclose that the recovery showed noteworthy differences. In particular, the growth momentum of the most important indicators has been poor for the United States until recently. At the same time, the productivity miracle seems to have come to an end.

There was general agreement that the financial markets play an outstanding role in the explanation of this currently difficult situation. The combination of a belief in a new paradigm, an unusual strength in the economy, an investment boom and an unusual strong rise in equities has been identified as the ingredients of a bubble economy which embodies the threat of a steep economic decline. A comparison of historic boom-bust-cycles back to the 19th century disclosed that the current state of the cycle shows similarities with periods preceding past phases of a sharp recession. It was suggested that, above all for the United States, such a pessimistic outlook must be considered (Jim O'Neill, Goldman Sachs).

This gloomy outlook for the US economy was heavily discussed, but no final conclusion could be drawn at the conference. The crucial question in this context was the existence of a new paradigm. If there is one, traditional patterns of business cycles can vary and historic comparisons will no longer be appropriate. But there is no clear-cut empirical evidence on the phenomenon of the "new economy", and economists differ in their assessment of the size of the current risks deriving from the financial markets and their potential to harm the global economic recovery.

US monetary policy is easy as is fiscal policy, with stimulating effects on the economy. Both, consumption and investment propensities have remained poor. Uncertainty and gloomy prospects hamper demand. The US savings rate has increased due to private households' efforts to offset, at least in part, the massive losses in the equity markets. A further increase is expected. Capacity utilisation of US industry is at its lowest level since the early 1980s, indicating a further slump in the demand for capital goods.

Slow growth, the Iraq war and the budget policy will result in a high government deficit, even after a couple of years of budget consolidation. The budget deficit coincides with a growing current account deficit. Thus, the US double deficits are back and will bring strain to the foreign exchange markets (Jim O'Neill, Goldman Sachs).

Asia has remained the only region enjoying an appreciable high growth momentum in a worldwide economic slowdown, despite the fact that it has not been able to de-couple fully from the general slow pace of growth and that it suffers from the collapse of the "new economy". The latter affects primarily South East Asia, a region which provides around 40 percent of the global supply of information technology products. But intra-Asian trade has gained in importance over the past decade, contributing to a more stable economic development.

As a consequence of the accession to the WTO, the PR China's economy is booming. Growing public expenditure, high investment of state-owned enterprises and soaring foreign direct investment are the major driving forces, whereas private consumption is not following suit. Although China's accession to the WTO will have positive effects on the overall growth of the economy in the long run, in the short run there are some obstacles. Positive capacity effects will only be realised in the garment and apparel industries. Most other industries face negative capacity effects induced by companies' strategic investment, which leads to excess capacity. Growing unemployment and the burden of comprehensive structural change have to be tackled in the medium term. A slow-down of growth to below the threshold of 5 to 7 percent is deemed critical and could raise serious problems. Seen in perspective, China has to cope with a state deficit of Japanese dimensions but there is the hope that China can grow out of these problems by accumulating sufficient positive assets (Markus Taube, University of Duisburg).

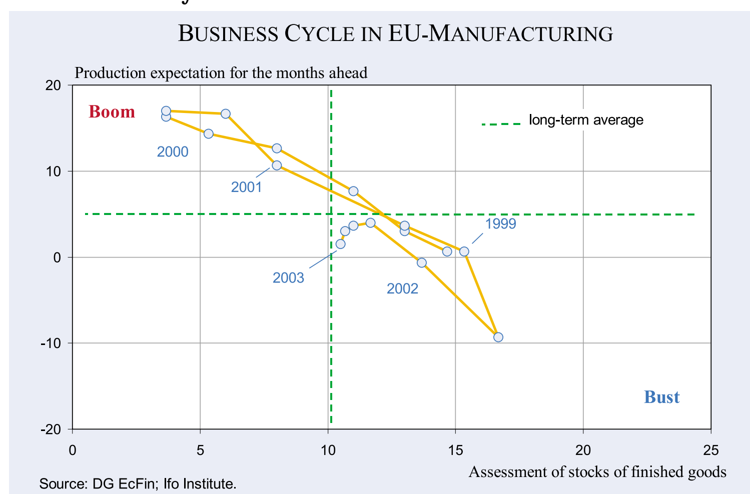
The global slowdown has coincided with more modest growth of the European economy (EU 15). The growth momentum had peaked in 2000 at a rate of 3.5 percent for gross domestic product. In 2001 and 2002 GDP grew by only 1.4 percent and 0.9 percent respectively. Under the assumption of a short Iraq war, a recovery is expected in the second half of 2003, which will not gain much momentum, however. GDP growth will average only 1.1 percent. As compared to the United States, the recovery will be less dynamic, although the distortions from the collapse of the "new economy" are less severe in Europe and pose a minor threat to the recovery. Underlying reasons for the poor European performance are the structural problems in some of the EU Member States, in particular Germany and Italy. Both of these countries are a drag on the EU growth potential. A prerequisite for better prospects for the EU economy are institutional changes in the social welfare systems and the labour markets (Hans-Werner Sinn, Ifo Institute).

The monetary policy of the European Central Bank (ECB) is torn between maintaining price stability with an inflation rate not to exceed 2 percent on average of the euro area and higher money supply growth to stimulate economic growth. The challenge for the ECB lies in big regional differences in inflation, ranging from around 1 percent in Germany to more than 4 percent in Ireland. The benchmark inflation rate of 2 percent for the euro area can turn out to be too low for some of the countries. Germany, in particular, could even experience deflation. An easier monetary policy could support the necessary adjustment processes among different Member States. Germany, for instance, entered the European Monetary Union with a currency that had not yet overcome the appreciation shock of 1992/93 resulting from unification. As nominal devaluation is no longer an option, adjustment may be promoted by fiscal policy (reduction of the tax burden and public expenditure), but eventually a lower inflation rate than for the rest of the euro area may be necessary. A low euro area inflation rate would demand an even lower inflation rate in Germany to restore equilibrium.

In the gloomy global environment, the European manufacturing industries experienced a setback after a rather long growth phase during the second half of the 1990s. Output of EU manufacturing had peaked in 2000 with growth of around 6 percent. In the following year output stagnated and in 2002 it even shrank by around 1 percent. Reasons for this setback were the slowdown of domestic demand and of foreign orders. In particular the intermediate product and the capital goods industries suffered from a breakdown of non-EU demand.

The most recent economic situation of the EU manufacturing industries is characterised by a modest recovery, indicated by moderately growing new order bookings in 2002. Orders received have slowed down once more and at present no more than a stagnation of new orders is expected. The business sentiment has worsened since early 2002. Production expectations have come down to almost zero and indicate stagna-

Figure 1
Ifo Business Survey



Source: DG EcFin; Ifo Institute.

tion for the current year. At the same time, companies have adjusted their capacities to the low level of demand and inventories have been markedly reduced since early 2002. A long-term comparison of both of these indicators discloses that the business sentiment is far less gloomy than during the last deep recession of 1992/93. Given the assumption that the Iraq war will be brief and that no further setback in the financial markets will distort the development of the real economy, the EU-manufacturing industries will recover in the second half of 2003. On average production will grow by around 1 percent.

The Iraq war has been identified as one explanation of the present slow growth by the sectoral experts who presented an in-depth analysis of the chemical industry, the steel industry, the capital goods industry, the automotive industry and the data processing and communication industry.

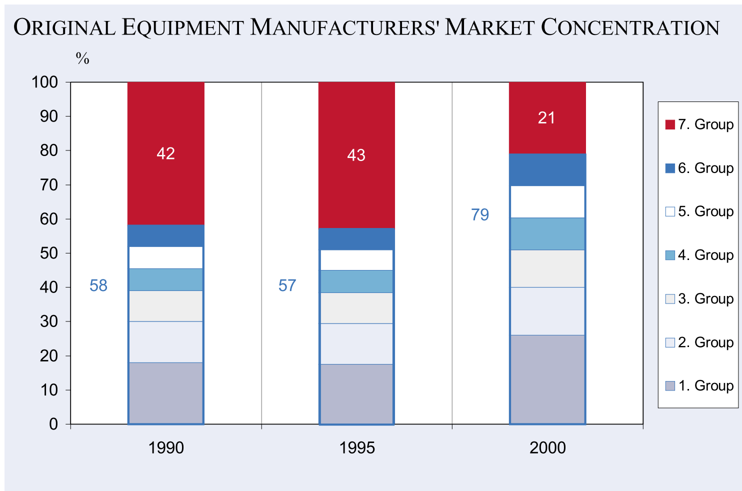
The impact of the Iraq war – whose start coincided with the first day of the conference – on the chemical industry was explicitly analysed. Under the assumption of a short war, there will only be a delay of the recovery and the growth rates of 2003 will be affected, but not those of 2004. In particular, there will be only a short hike in oil prices which will have a limited effect on the global economy. The chemical industry will gain momentum in the course of 2003 (Ralf Gronych, BASF).

The European steel industry has faced the challenge of low domestic demand, but was able to expand exports during the latter half of the 1990s. The global economic slowdown and the US tariffs on steel, which became effective just recently, have worsened the economic environment. Mentioned as a major risk for the outlook of the steel industry was a slump of economic activity in the PR China. If this occurs, the global market will come under extreme pressure of excess supply. Currently China absorbs much of the surplus production in other regions like Japan, and in the short term no fundamental change can be expected (Tony Cockerill, University of Durham).

The European capital goods industries play an outstanding role in international markets. They are leading the pace of innovation ahead of the United States and Japan. They strongly benefited from the bright economic environment during the latter half of the 1990s, although domestic demand grew only modestly. The industrialisation of emerging economies has been one of the driving forces nourished above all by foreign direct investment. Since 2000 the boom has faded, with the exception of the PR China. With regard to the low capacity utilisation in many industrialised countries, the growing financing difficulties for big investment projects in emerging countries imply that the short-term outlook cannot be very bright, although the decline of new orders should have levelled out and a recovery is expected for the capital goods industries (Paul van Roon, Orgalime).

The global automotive market is evolving from national to regional oligopolies. While in the beginning of the 1990s the biggest seven suppliers commanded a 60 percent share of the global market, this has changed within a decade. Nowadays their share is around 80 percent and competition has become more intensive. The EU is in a specific situation. The three major suppliers command only a bit more than half the market, whereas in Japan and the United States the share of the major three is around 70 percent. There is intensive competition among suppliers to gain share, which affects the profitability of the European automobile companies. Although there are some constraints on competition via exclusive sales contracts of manufacturers with their distributors and service agencies, profits are lower than in Japan or the United States.

Figure 2
Automotive Industry



Global competition forces the automotive manufacturers to enter emerging markets and to fight for market share in countries with high growth rates. But in terms of volume, the mature markets of the United States, Europe and Japan are of much greater importance, although they do not provide sufficient growth potential. In the emerging markets, massive investment induces tougher competition and in spite of growing demand profits remain under pressure, whereas in mature markets, lacking growth increases price pressure. In this competitive environment the consolidation of the automotive industry will continue and induce structural change, above all in the more scattered European suppliers (Christophe Chabert, Renault).

The information technology (IT) sector has been hit hard by the collapse of the "new economy". Previous over-investment caused a slump in demand and the adjustment of capacities has not yet come to an end. At the same time, the factors driving the market shifted away from the clients' need to reduce costs and increase labour productivity. The industry entered a phase of incremental progress and search for a new paradigm. New options for the IT industry are currently emerging. The future driving forces are expected to lie more in the area of strengthening clients' competitiveness and supporting business expansion. Further opportunities are perceived in a growing supply of IT services, among them the operation of clients' IT departments etc. Although there are areas of new activities which can be penetrated by IT companies, double-digit growth rates are a thing of the past (Uwe Kühne, IBM).

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Report on the European Economy 2003

CHAPTER 1
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CHAPTER 2
Fiscal Policy

CHAPTER 3
Subsidiarity

CHAPTER 4
Financial Architecture

CHAPTER 5
Brain Drain

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