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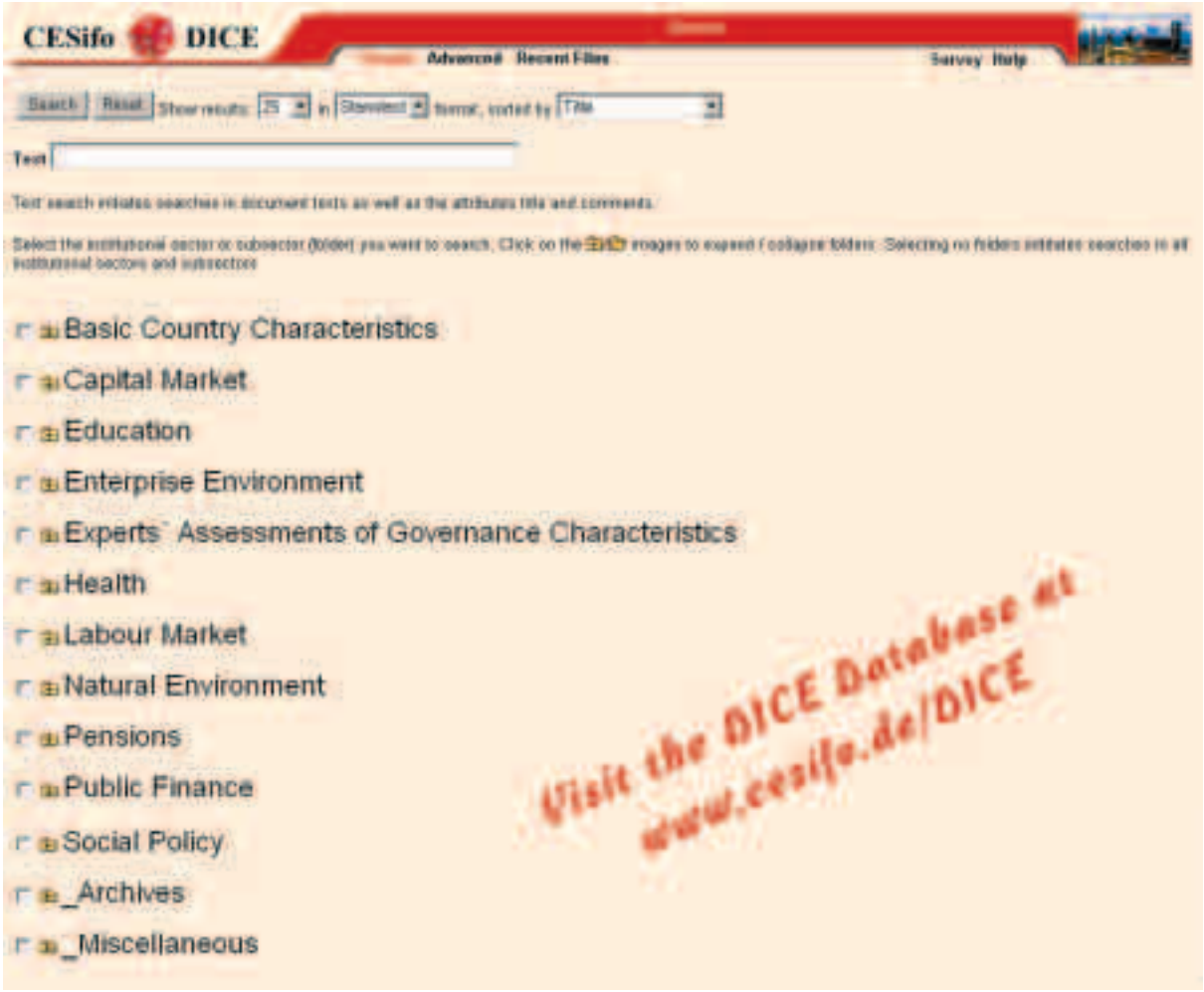

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Regulation of the Electricity Market

Incentive Regulation for Electricity Networks*

Paul L. Joskow**

Effective regulation of the terms and conditions of network access, network interconnection and delivery prices, network investment and network service quality have been important components of all successful electricity sector liberalization programs around the world. The benefits of a good regulatory framework include lower network service costs, improvements in service quality, investment to expand the infrastructure to support changes in the level and geographic configuration of demand and generation and the development of good network platforms to support robust competitive wholesale and retail markets.

In what follows I will assume that effective electricity sector restructuring and unbundling mechanisms have been put in place so that there are clearly defined distribution and transmission network entities offering unbundled delivery and network support services to market participants. I will also assume that electricity networks are regulated monopolies[1] and that an independent regulator with adequate staff resources has been created to oversee the regulation of the distribution and transmission networks. The paper then focuses on the attributes of alternative types of "incentive" or "performance-based" regulation of distribution and transmission network price levels and service quality.

Theoretical considerations

The primary goal of regulation in the public interest is to stimulate the regulated firm to produce output efficiently in the cost and service quality dimensions, to price the associated services efficiently, to produce output to meet demand with adequate levels of reliability and to achieve these goals consistent with satisfying a break-even or budget-balance constraint for the regulated firm. Much of the traditional literature on natural monopoly regulation assumes implicitly that regulators are perfectly informed about the regulated firm's cost opportunities and demand patterns and can effectively enforce cost minimization on the regulated firm.[2] The literature then focuses on second-best pricing of the services provided by the regulated firm given defined cost functions, demand attributes and budget balance constraints (e.g. Ramsey-Boiteux pricing, non-linear pricing, etc.).[3] The traditional literature has not focused on incentives to minimize costs or improve other dimensions of firm performance (e.g. service quality attributes).

In reality regulators also care about the production efficiency and service quality implications of the regulatory mechanisms they choose, and they are neither completely informed nor completely uninformed about relevant cost, quality and demand attributes faced by the regulated firm. Regulators have *imperfect* information about these firm and market attributes. Moreover, the regulated firm generally has more information about these attributes than does the regulator. Furthermore, managers have the discretion to make choices not only about input proportions but also about how hard they will work to minimize the firm's costs or with respect to the levels of service quality. Accordingly, the regulated firm may use its information advantage *(asymmetric information)* strategically to exploit the regulatory process to increase its profits or to pursue other managerial goals, to the disadvantage of consumers (Laffont and Tirole 1993, Chapter 1.) This creates potential moral hazard (e.g. too little man-

* This paper is based on a longer study "Incentive Regulation in Theory and Practice: Electric Distribution and Transmission," prepared for the National Bureau of Economic Research regulation project.
http://econ-www.mit.edu/faculty/download_pdf.php?id=1220

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[1] The economic attributes of unregulated "merchant" transmission network investment are discussed in Joskow and Tirole (2005).

[2] An exception is the extensive theoretical and limited empirical literature following Averch and Johnson (1962), and especially after Baumol and Klevorick (1970), which examines potential distortions in input proportions caused by rate-of-return constraints emerged. The empirical foundations for these theories are discussed in Joskow and Rose (1989).

[3] Braeutigam (1989).

agerial effort resulting in excessive costs) and adverse selection (e.g. prices that are too high relative to production costs), problems that effective regulatory mechanism design must address. The recent theoretical literature on incentive regulation focuses on devising regulatory mechanisms to respond to these moral hazard and adverse selection problems (Laffont and Tirole 1993; Armstrong and Sappington 2005).

Consider a situation in which the regulator is uncertain about the firm's true underlying cost and cost reduction opportunities. The regulator cannot observe the level of managerial effort expended by the firm, but the regulator can monitor accurately the firm's realized costs ex post. The regulated firm knows its true cost opportunities, its managerial effort and the effects of managerial effort on costs. Following Laffont and Tirole (1993, 10–19), under these assumptions we can think of two polar case regulatory mechanisms that might be applied to a monopoly firm producing a single product with a fixed quality. The first regulatory mechanism involves setting a fixed price ex ante that the regulated firm will be permitted to charge going forward (i.e. effectively forever). In a dynamic setting this is equivalent to a pricing *formula* that starts with a particular price and then adjusts this price for *exogenous* changes in input price indices and other exogenous indices of cost drivers (again, effectively forever). This type of regulatory mechanism can be characterized as a *fixed price* regulatory contract or, in a dynamic setting, a *price cap* regulatory mechanism.

Because prices are fixed with this mechanism (or vary based only on exogenous indices of cost drivers) and do not respond to changes in managerial effort or ex post cost realizations, the firm and its managers keep 100 percent of any cost reductions they realize by increasing effort. Accordingly, and ignoring service quality and investment considerations for now, this mechanism provides incentives to induce efficient levels of managerial effort and cost reduction. However, because the regulator must ensure that any regulatory mechanism it imposes on the regulated firm meets a budget balance constraint, when the regulator is uncertain about the regulated firm's true cost opportunities she will have to set a relatively high fixed price (or dynamic price cap) to ensure that *if* the firm is indeed inherently high cost, the prices under the fixed price contract or price cap will be high enough to cover the firm's (efficient but high) realized costs. Accordingly, while a fixed price mechanism does well from the perspective of providing incentives to reduce costs, it is potentially very poor at "rent extraction" for the benefit of consumers and society because prices may be too high relative to the firm's true cost opportunities.

At the other extreme, the regulator could implement a "cost of service" regulatory contract where the firm is assured that it will be compensated for all of the costs of production that it actually incurs and no more. After the firm produces, the regulator's uncertainty about whether the firm is a relatively high or a low cost opportunity firm will be resolved. And since the regulator compensates the firm only for its realized costs, there is no "rent" left to the firm or its managers in the form of excess profits. This solves the "rent extraction" or "adverse selection" problem that would arise under a fixed price contract. However, this kind of cost of service regulatory mechanism does not provide any incentives for the management to exert optimal (indeed any) effort. Even though there are no "excess profits" left to the firm, the actual costs incurred by the firm may be inefficiently high as a result of too little managerial effort. Managers now retain 0 percent of any cost savings they achieve and have no incentive to exert cost-reducing effort. Accordingly, consumers may now be paying higher prices than they would have to pay if the management could be induced to exert more effort to reduce costs. Indeed, it is this kind of managerial slack and associated x-inefficiencies that most policymakers have in mind when they discuss the "inefficiencies" associated with regulated firms.

Fixed-price contracts (or price caps) are good at providing incentives for managerial efficiency and cost minimization but bad at extracting the benefits of the lower costs for consumers. Cost of service contracts are good at aligning prices and costs but the costs will be excessive due to suboptimal managerial effort. Perhaps not surprisingly, the optimal regulatory mechanism in the presence of imperfect and asymmetric information will lie somewhere between these two extremes. It will have a form similar to a *profit sharing* contract or a *sliding scale* regulatory mechanism where the price that the regulated firm can charge is *partially* responsive to or contingent on changes in realized costs and *partially* fixed ex ante (Schmalensee 1989; Lyon 1996). More generally, by offering the regulated firm a *menu* of cost-contin-

gent regulatory contracts with different cost sharing provisions, the regulator can do even better than if it offers only a single profit sharing contract (Laffont and Tirole 1993).

Price cap mechanisms in practice

While the theoretical literature on incentive regulation is quite rich, it still provides relatively little direct guidance for practical application in real-world circumstances. In practice, well-designed incentive regulation programs have adopted fairly simple mechanisms that reflect the basic theoretical issues discussed above.

A particular form of incentive regulation was introduced for the regulated segments of the privatized electric gas, telephone and water utilities in the UK, New Zealand, Australia and portions of Latin American as well as in the regulated segments of the telecommunications industry in the US.[4] This mechanism chosen is the "price cap" (Beesley and Littlechild 1989; Brennan 1989; Armstrong, Cowan and Vickers 1994; Isaac (1991)). Under price cap regulation the regulator sets an initial price p_0 (or a vector of prices for multiple products). This price (or a weighted average of the prices allowed for firms supplying multiple products or different types of customers) is then adjusted from one year to the next for changes in inflation (rate of input price increase or RPI) and a target productivity change factor "x".[5] Accordingly, the price in period 1 is given by:

$$p_1 = p_0 (1 + RPI - x)$$

In theory, a "forever" price cap mechanism is a high-powered "fixed price" regulatory contract that provides powerful incentives for the firm to reduce costs. Moreover, if the price cap mechanism is applied to a (properly) weighted average of the revenues the firm earns from each product it supplies, the firm has an incentive to set the second-best prices for each service (Laffont and Tirole 2000) given the level of the price cap. As already noted, however, when the regulator has imperfect information about the firm's cost opportunities and must meet a budget balance constraint, pure "forever" price cap mechanisms are not optimal from the perspective of an appropriate tradeoff between efficiency incentives and rent extraction (Schmalensee 1989) and would leave too much rent to the firm with "average" cost characteristics. Finally, any incentive regulation mechanism that provides incentives only for cost reduction also potentially creates incentives inefficiently to reduce service quality when service quality and costs are positively related to one another.

In practice, "forever" price caps are not typically used in the regulation of distribution and transmission network price levels. Some form of cost-based regulation is used to set an initial value for p_0. The price cap mechanism then operates for a pre-established time period (e.g. 5 years). At the end of this period a new starting price p_0 and a new x factor are established after another cost-of-service and prudence or efficiency review of the firm's costs. That is, there is a pre-scheduled regulatory process to reset or "ratchet" prices based partially on costs realized during the previous period. In addition, price caps are often only one component of a larger portfolio of incentive mechanisms that include quality of service incentives, as discussed in the next section. Finally, regulated electric distribution and transmission network firms' ability to determine the structure of prices for different types of customers or for services provided at different locations on the network under an overall revenue cap is typically limited. As a result, price caps are properly thought of as cost and quality incentive mechanism not as a mechanism to induce optimal second-best pricing of various network services.

A natural question to ask about price cap mechanisms is where does "x" (and perhaps p_0) come from? In England and Wales and some other countries, statistical benchmarking methods have come to be used to help to determine the relative efficiency of individual firms' operating costs and service quality compared to their peers. This information can then be used as an input to setting values for both p_0 and x (Jamasb and Pollitt 2001 and 2003; OFGEM 2004a) to provide incentives for those far from the efficiency frontier to move toward it and to reward the most efficient firms in order to induce them to stay on the efficiency frontier. In effect this is an application of yardstick regulation (Shleifer 1985).

[4] The US is behind many other countries in the application of incentive regulation principles to electric distribution and transmission, though their use is slowly spreading beyond telecommunications.

[5] Many implementations of price cap regulation also have "z" factors. Z factors reflect cost elements that cannot be controlled by the regulated firm and are passed through in retail prices. For example, in the UK, the charges distribution companies pay for connections to the transmission network are treated as pass-throughs. Changes in property tax rates are also often treated as pass-throughs.

Although it is not discussed too much in the theoretical or empirical literature on price caps, capital-related costs are handled quite differently from operating costs in the establishment and resetting of p_o and x. The limited attention paid to capital-related costs in the academic literature provides a potentially misleading picture of the challenges associated with implementing a price-cap mechanism effectively. This is the case for several reasons. First, in practice, the p_o and x values must be developed based not only on a review of the relative efficiency of each firm's operating costs, but also based on the value of the firm's current capital stock or rate base, forecasts of future capital additions required to provide target levels of service quality, and the application of depreciation rates, estimates of the cost of the firm's debt and equity capital, assumptions about the firm's dept/equity ratio, tax allowances and other variables to turn capital stocks into prices for capital services over time. The capital cost related allowances represent a large fraction of the total price (p_o) of supplying unbundled electricity network services so the choices of these parameters for defining capital user charges are very important. Second, allowances for capital-related costs are established through more traditional utility planning and cost-of-service regulatory accounting methods including the specification of a rate base (or regulatory asset value), depreciation rates, debt and equity costs, debt/equity ratios, tax allowances, etc. This is the case because the kinds of statistical benchmarking techniques that have been applied to operating costs have not been developed for capital-related costs, due to significant heterogeneity between firms in terms of the age of assets, geography, service quality, lumpiness of capital investments and other considerations. Third, the efficiency properties of a regulatory mechanism that mixes competitive benchmarking with more traditional forward-looking rate of return regulation are more complex than first meets the eye (Acemoglu and Finkelstein 2006). Thus, the implementation of price cap mechanisms is more complicated than is often implied and places a significant burden of information collection, auditing and analysis on regulators. It involves the application of elements of traditional cost of service regulation, yardstick regulation and high-powered "fixed price" incentives.

The challenge of forecasting future investment needs and costs for electricity network firms has historically been a rather contentious process, sometimes yielding significant differences between what the regulated firms claim they need and what the regulator claims they need to meet their legal responsibilities to provide safe and reliable service efficiently. In the most recent price review in the UK, the regulator adopted an innovative approach involving a "menu" of sliding scale mechanisms to resolve the asymmetric information problem faced by the regulator as she tries to deal with differences between the firms' claims and the consultants' claims (OFGEM 2004b) about future capital investment requirements to meet reliability targets. The sliding scale menu allows firms to choose between getting a lower capital expenditure allowance but a higher powered incentive (and a higher expected return on investment) that allows them to retain more of the cost reduction if they can beat the target expenditure levels or a higher capital expenditure allowance combined with a lower powered sliding scale mechanism and lower expected return (OFGEM 2004b). This is an application of Laffont and Tirole's menu of cost-contingent contracts mechanism and provides a more effective way to deal with the imperfect and asymmetric information conditions and associated adverse selection problems than the traditional approach of offering a single regulatory contract.

An example of the use of profit-sharing or cost-contingent form of incentive regulatory mechanisms can be found in the incentive mechanism that has been applied to the costs of the transmission system operator (SO) in England and Wales, which is also the transmission owner (TO), though there are separate regulatory mechanisms for SO and TO functions. Each year forward targets are established for the costs of system balancing services and system losses (OFGEM 2005). A sharing or sliding scale formula is specified which places the TO at risk for a fraction (e.g. 30 percent) of deviations from this benchmark (up or down) with caps on profits and losses. There is also a cap and a floor. In recent years the SO was given a menu of three alternative incentive arrangements with different sharing fractions and different caps and floors (with costs of service as a default) from which to choose. If the SO were to choose the cost-of-service default, it would suggest that in constructing the menu, the regulator had underestimated the range of the SO's future cost realizations.

Service quality incentives

As noted earlier, any incentive regulation mechanism that provides incentives only for cost reduction also potentially creates incentives to reduce service

quality when service quality and costs are positively related to one another. Accordingly, price cap mechanisms are increasingly accompanied by a set performance standards and associated penalties and rewards for the firm for falling above or below these performance norms. Similar mechanisms are used by several US states and in other countries that have liberalized their electricity sectors (e.g. New Zealand, Netherlands, and Argentina).

In the UK, the regulator (OFGEM) has developed several incentive mechanisms targeted at various dimensions of distribution network service quality (OFGEM 2004b; 2004c). These include: (a) two distribution service interruption incentive mechanisms targeted at the number of outages and the number of minutes per outage, (b) storm interruption payment obligations targeted at distribution company response times to outages caused by severe weather events, (c) quality of telephone responses during both ordinary weather conditions and storm conditions, (d) and a discretionary award based on surveys of customer satisfaction. OFGEM uses statistical and engineering benchmarking studies and forecasts of planned maintenance outages to develop targets for the number of customer outages and the average number of minutes per outage for each distribution company.

Until recently in the UK there was no formal incentive mechanism that applied to transmission system reliability – network failures that lead to administrative customer outages or "unsupplied energy." In 2005, a new incentive mechanism that focuses on the reliability of the transmission network as measured by the quantity of "unsupplied energy" resulting from transmission network outages went into effect (OFGEM 2004d). NGC is assessed penalties or receives rewards when outages fall outside of a "deadband" of ± 5 percent defined by the distribution of historical outage experience (and with potential adjustments for extreme weather events), using a sliding scale with a cap and a floor on the revenue impact.

Performance attributes

Incentive regulation has been promoted as a straightforward and superior alternative to traditional cost of service or rate of return regulation. In practice, incentive regulation is more a complement to than a substitute for traditional approaches to regulating network monopolies. In some ways it is more challenging. Incentive regulation in practice requires a good accounting system for capital and operating costs, cost reporting protocols, data collection and reporting requirements for dimensions of performance other than costs. Capital cost accounting rules are necessary, a rate base for capital must still be defined, depreciation rates specified and an allowed rate of return on capital determined. Comprehensive "rate cases" or "price reviews" are still required to implement "simple" price cap mechanisms. Planning processes for determining needed capital additions are an important part of the process of setting total allowed revenues going forward. Performance benchmarks must be defined and the power of the relevant incentive mechanisms determined.

The information burden to implement incentive regulation mechanisms well is certainly no less than for traditional costs of service regulation. What distinguishes incentive regulation in practice from traditional costs of service regulation is that this information is used more effectively. Whether the extra effort is worth it depends on whether the performance improvements justify the additional effort.

Unfortunately, there has been relatively little systematic analysis of the effects of the application of incentive regulation mechanisms on the performance of electric distribution and transmission companies.[6] Improvements in labor productivity and service quality have been documented for electric distribution systems in England and Wales, Argentina, Chile, Brazil, Peru, New Zealand and other countries (Newbery and Pollitt 1997; Rudnick and Zolezzi 2001; Bacon and Besant-Jones 2001; Estache and Rodriguez-Pardina 1998; Pollitt 2004). However, most of these studies have focused on developing countries where the pre-reform levels of performance were especially poor prior to restructuring. Moreover, it is difficult to disentangle the effects of privatization, restructuring and incentive regulation from one another.

The most comprehensive study of the post-reform performance of the regional electricity distribution companies in the UK (distribution and supply functions) has been done by Domah and Pollitt (2001). They found significant overall increases in productivity over the period 1990 to 2000 and lower real

[6] There is a much more extensive body of empirical work that examines the effects of incentive regulation mechanisms, primarily price caps, on the performance of telecommunications firms.

"controllable" distribution costs compared to a number of benchmarks. However, controllable costs and overall prices first rose in the early years of the reforms before falling dramatically after 1995 and the first application of price cap mechanisms to the distribution networks in 1990 was too generous (average of RPI + 2.5 percent) and a lot of rent was initially left on the table for the RECs' initial owners (who cleverly soon sold out to foreign buyers). Distribution service quality in the UK, at least as measured by supply interruptions per 100 customers and average minutes of service lost per customer, has improved as well in the UK since the restructuring and privatization initiative in 1990. This suggests that incentive regulation has not led, as some had feared, to deterioration in these dimensions of service quality.

The experience with the transmission system operator (SO) incentive mechanism in England and Wales also provides a good example of how incentive regulation can improve performance. During the first few years following the restructuring of the electricity sector in England and Wales in 1990, the SO recovered the costs of system balancing, including managing congestion and other network constraints through a simple cost pass-through mechanism. The SO's costs escalated rapidly, growing from about $75 million per year in 1990/91 to almost $400 million per year in 1993/94. After the introduction of the SO incentive scheme in 1994, these costs fell to about $25 million in 1999/2000. OFGEM estimates that NGC's system operating costs fell by about £400 million between 1994 and 2001. A new SO incentive scheme was introduced when NETA went into operation in early 2001. The SO's costs have fallen by nearly 20 percent over the three year period since the new scheme was introduced (OFGEM 2003).

While more work needs to be done on the performance of incentive regulation mechanisms applied to electric distribution and transmission systems, the experience so far is very encouraging.

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Unilateral Market Power in Wholesale Electricity Markets

Frank A. Wolak*

The past two decades of international experience with wholesale electricity markets has demonstrated that significant consumer harm can result from firms simply engaging in unilateral profit-maximizing behavior given the actions of their competitors. Different from other product markets, coordinated actions among suppliers or the concentration of production capacity in the hands of a small number of firms is unnecessary for some suppliers to be able to raise prices substantially above competitive levels for sustained periods of time.

Wholesale electricity markets with Hirshman-Herfindahl Indexes (HHIs) that would not raise market power concerns if they were from other industries have been subjected to severe market power problems. The relevant competition authorities have not found evidence of coordinated actions to raise prices in violation of the competition or antitrust law during any of these market power episodes. These facts provide strong evidence that competition or antitrust policy as it is applied to other industries may be insufficient to protect electricity consumers from substantial economic harm.

The technology of electricity production and remnants of the former monopoly regime imply that conventional competition policy must be augmented with an industry-specific regulator endowed with a pre-specified set of responsibilities. This combination of regulatory oversight and competition law will provide consumers with the same level of market power protection they receive for other products from conventional competition law. An industry-specific regulator is necessary because: (1) unilateral market power problems can be extremely difficult to predict, and (2) they can impose significant economic harm even though they occur for a short period of time.

Clearly specified regulatory safeguards tailored to the electricity supply industry are needed to prevent the harmful exercise of unilateral market power before it can occur and rapidly implement the necessary remedies if it does occur. The primary goal of this regulatory process should be to prevent market participant behavior that significantly degrades system reliability and market efficiency, rather than prevent the exercise of unilateral market power.

The role of the regulatory process is to ensure that the conditions necessary for vigorous competition exist and to limit the economic harm associated with the exercise of unilateral market power when they do not exist. Regulatory mechanisms that attempt to prevent all exercise of unilateral market power can introduce market inefficiencies that cause more economic harm than the market power they are attempting to prevent.

Why electricity is different

It is difficult to conceive of an industry more susceptible to the exercise of unilateral market power than electricity. It possesses virtually all of the product characteristics that enhance the ability of suppliers to exercise unilateral market power. Supply must equal demand at every instant in time and each location of the network. Electricity is very costly to store and production is subject to extreme capacity constraints in the sense that it is impossible to produce more than a pre-specified amount of energy from a generation unit in an hour. Delivery of the product consumed must also take place through a potentially congested transmission network. How electricity has been priced to final consumers makes wholesale demand extremely inelastic, if not perfectly inelastic, with respect to the wholesale price. The technology of electricity production historically favored large generation facilities, and in most wholesale markets

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the vast majority of these facilities are owned by a relatively small number of firms. Finally, generation capacity ownership also tends to be concentrated in small geographic areas within these regional wholesale markets. All of these factors also make wholesale electricity markets substantially less competitive the shorter the time lag is between the date the sale is negotiated and the date delivery of the electricity occurs.

The uncertain availability of generation units and portions of the transmission network implies that system conditions can arise when virtually any generation unit owner in the wholesale market possesses substantial market power in the local market created by the transmission congestion or generation unit outages. Consequently, a prospective local market power mitigation (LMPM) mechanism that provides effective bid mitigation is a necessary component of any wholesale market design. The need for an independent entity charged with the design and administration of the LMPM mechanism implies the first rationale for an industry-specific regulator.

A second rationale for an industry-specific regulator during the transition period is the potential for small market design flaws that cause little harm during most system conditions to lead to substantial consumer harm under certain system conditions. The experience of California illustrates this point. From the start of the California market in April 1998 until April 2000, it was probably the most competitive wholesale market in the US. Conditions changed when it became clear that the amount of hydroelectric energy available from the Pacific Northwest during the summer of 2000 was significantly less than the previous two summers.

As documented in Wolak (2003a), the five largest fossil fuel electricity suppliers in California now faced significantly less elastic residual demand curves than they did during first two summers of the market and these suppliers found it in their unilateral interest to bid less aggressively into the spot market in order to raise wholesale electricity prices in California. As discussed in Wolak (2003b), this strategy was not unilaterally profitable during the first two years of the market because the greater availability of hydroelectric energy from the Pacific Northwest and inexpensive coal-fired energy from the Desert Southwest during that time period caused these suppliers to face significantly more elastic residual demand curves.

This change in competitive conditions during the summer of 2000 enabled in-state suppliers to raise prices substantially through their unilateral actions. The California experience demonstrates that some market design flaws, in this case insufficient forward contracting by electricity retailers, can be relatively benign under a range of system conditions. However, when system conditions conducive to the exercise of unilateral market power occur, this market design flaw can cause enormous harm to consumers. Consequently, industry-specific regulatory oversight is necessary to intervene as quickly as possible to limit harm when these system conditions arise.

Besides the need to correct market design flaws after they are determined to be harmful, there is also a need to engage in prospective market monitoring to find market design flaws that lead to substantial harm by less noticeable means. Aspects of the market design can enhance the ability of suppliers to exercise their unilateral market power. Therefore, another important role for an industry-specific regulator is to monitor the wholesale market to determine prospectively which market rules might enhance the ability of suppliers to exercise unilateral market power or increase the likelihood that the attempts of suppliers to coordinate to raise market prices will be successful.

This role for the industry-specific regulator also has a pedagogical component. The transition to a wholesale market regime involves a dramatic change in behavior by a number of market participants. Companies that fail to adapt to the new regime are very likely to go bankrupt and exit the industry, but there are often significant external costs to consumers associated with this outcome. Consequently, an industry-specific regulator can take prospective actions to encourage adaptation to the new regime and limit the resulting external costs if this change in market participant behavior does not occur.

Responsibilities of industry-specific regulator

The three major responsibilities of the industry-specific regulator are: (1) disseminating information to existing and prospective market participants, (2) ensuring compliance with all the market rules, and (3) protecting against behavior that degrades market efficiency and system reliability.

"Smart sunshine regulation"

A minimal requirement of any industry-specific regulatory process is to provide "smart sunshine regulation". The regulator must have access to all information needed to operate the market and be able to perform analyses of this data and release the results to the public. At the most basic level, the regulator should be able to replicate market-clearing prices and quantities given the bids submitted by market participants, total demand and other information about system conditions. This is necessary for the regulator to verify that the market is operated in a manner consistent with what is written in the market rules.

The second crucial aspect of "smart sunshine regulation" is public data release. Specifically, all data submitted to real-time market and produced by the system operator should be immediately released to the public. The public data release should identify the market participant and specific generation unit associated with each bid, generation schedule or output level. Masking the identity of the market participants, as is done in all US wholesale markets, limits the disciplining value of public data release on market participant behavior.

Another potential benefit associated with public data release is that it enables third-parties to undertake analyses of market performance. The US policies on data release severely limit the benefits from this aspect of a public data release policy. Releasing data with the identities of the market participant masked makes it impossible to definitively match data from other sources to specific market participants. For example, some market performance measures require matching data on generation unit-level heat rates or input fuel prices obtained from other sources to specific generation units. Strictly speaking, this is impossible to do if the unit name or market participant name is not matched with the generation unit.

A long time-lag between the date the data is produced and the date it is released, as is the case in all US markets, also greatly limits the range of questions that can be addressed with this data. Taking the example of the California electricity crisis, by 1 January 2001, the date that masked data from June of 2000 was first made available to the public, the exercise of unilateral market power in California had already resulted in more than $5 billion in overpayments to suppliers in the California electricity market, as measured by Borenstein, Bushnell and Wolak (2002). Consequently, a long time-lag between the date the data is produced and the date it is released to the public has an enormous potential cost to consumers that should be balanced against the benefits of delaying the data release.

Ensuring compliance with market rules

Many market outcomes that are harmful to system reliability and market efficiency could be prevented if market participants fulfilled all of their contractual obligations. If the cost of violating a contractual commitment or market rule is less than the unilateral benefit from this action, the market participant will find it profitable to violate, which also adversely impacts system reliability and market efficiency. This logic implies that the second responsibility of the regulatory process is to: (1) design market rules to resemble publicly verifiable contractual obligations and (2) determine the appropriate penalties and sanctions to deter violations of these rules without adversely impacting market efficiency or system reliability.

A large fraction of harmful market outcomes can be prevented and the costs of operating the market and the costs of participating in the market will be lower if all market participants are confident that all contractual commitments will be honored regardless of system conditions. Contract enforcement costs stem from ambiguous or overly broad market rules or market rules that are not, or cannot be, enforced. A transparent rule that can be rigorously enforced is superior to an overly broad rule that is difficult to enforce. Irregular enforcement, either because of imprecise rules or inconsistent effort, increases the cost of market participation. This can also lead to increased market rule violations as more market participants push the boundaries of acceptable behavior.

This logic implies that regulators should divide market rules into two categories: (1) those that resemble publicly verifiable contractual obligations with little subjective judgement to determine compliance, and (2) those that require a formal administrative process to determine compliance. Rules in first category should be written to limit ambiguity and simplify enforcement. Those in the second category should have pre-specified administrative processes that deter behavior harmful to system reliability and

market efficiency because of the large amount of judgement associated with determining that a violation has occurred.

Both types of market rules require penalty and sanction mechanisms, but for slightly different purposes. In both cases, penalties and sanctions are imposed to deter market rule violations. For the market rules for which determining compliance is straightforward, the penalties and sanctions are the primary mechanism for deterring violations. For the cases that require subjective judgement to determine a violation, penalties and sanctions are the ultimate backstop, but the administrative process is the primary mechanism for preventing harmful market outcomes.

Protecting against behavior harmful to market efficiency and system reliability

The final responsibility for the regulator is to deter behavior that is harmful to system reliability and market efficiency. This behavior may still occur despite public disclosure of the market outcome and the offending actions of the market participant as well as the assessment of penalties for market-rule violations. The regulator should have the authority to intervene if all of these actions fail to stop the harmful market outcomes. Protecting against harmful market outcomes is the most complex aspect of the regulatory process, but it also has the potential to yield the greatest benefit. It involves a number of inter-related tasks.

Local market power mitigation (LMPM) mechanism. In all bid-based electricity markets a local market power mitigation mechanism is necessary to limit the price bids a supplier submits when there is insufficient competition to serve a local energy need. An LMPM mechanism is a pre-specified administrative procedure (usually written into the market rules) that determines: (1) when a supplier has local market power worthy of mitigation, (2) what the mitigated supplier will be paid, and (3) how the amount the supplier is paid will impact the payments received by other market participants. It is increasingly clear to regulators around the world, particularly those that operate markets using Locational Marginal Pricing (LMP), that formal regulatory mechanisms are necessary to deal with the problem of insufficient competition to serve certain local energy needs.

Formulate and implement efficiency-enhancing market rule changes. The regulator must determine which market rules detract from market efficiency or system reliability and formulate and implement the appropriate market rule changes. Because the level and geographic distribution of demand, the mix of input fuels used and ownership shares for generation capacity in the control area, and the configuration of the transmission network can all change over time, market rules must also change. The regulator must continually analyze and assess the market efficiency impacts of all market rules. Once it has identified a deficient market rule, the regulator must then work with the system and market operators to devise the necessary remedy. This duty underscores the need for the regulator to analyze market performance using the data it has compiled.

Penalize behavior harmful to system reliability and market efficiency. The regulator is the first line of defense against harmful market outcomes. Persistent behavior by a market participant that is harmful to market efficiency or system reliability should be subject to penalties and sanctions. In order to assess these penalties, the regulator must first determine whether the market participant intended to harm system reliability and market efficiency. The market rules should contain a general provision prohibiting persistent behavior detrimental to system reliability and market efficiency. The goal of this provision is to establish a process for the regulator to intervene to prevent a market meltdown. A well-defined process must exist for the regulator to intervene to protect market participants and correct the market design flaw facilitating this harm.

Determine when market activities can be temporarily suspended. The regulator must have the ability to suspend market operations on a temporary basis when system conditions warrant it. The suspension of market operations should only occur after a pre-specified administrative procedure has been followed and it has been determined that it is the only option available to the regulator to prevent significant harm to market efficiency and system reliability. As has been demonstrated in various countries around the world, electricity markets can sometimes become wildly dysfunctional and impose enormous harm over a very short period time. Under these sorts of circumstances, the regulator should have the ability to suspend market operations temporarily until the problem can be dealt with through a longer-term regulatory intervention or market rule change.

Preventing behavior detrimental to system reliability and market efficiency

This aspect of the regulatory process addresses the concerns about harmful market outcomes typically voiced by parties claiming market manipulation. However, it avoids what I believe to be the impossible task of demonstrating that a market participant manipulated the market. Whether a market participant's actions constitute market manipulation depends on one's perspective. Viewed from one perspective, all suppliers that attempt to impact the price they are paid through their own unilateral actions are engaging in market manipulation.

The extent of unilateral market power possessed by a supplier is typically measured by its ability to move market prices through its unilateral actions. Consequently, a blanket prohibition of market manipulation written into the market rules seems to prohibit suppliers from maximizing profits given the actions of their competitors. These actions can lead to market outcomes that benefit consumers when all suppliers face sufficient competition. This logic is why there is no explicit prohibition against market manipulation under US antitrust law – it amounts to prohibiting behavior that is a major driver of the benefits in competitive markets.

The prohibition of behavior that is detrimental to system reliability and market efficiency focuses on identifying and eliminating detrimental behavior by market participants rather than on punishing this behavior. Penalties and sanctions are a last resort when all other options for eliminating the behavior have been tried, including asking the market participant to stop because of the significant harm this behavior is imposing on other market participants.

The major difficulty associated with implementing this market rule is that the regulator would have to infer from a market participant's behavior whether its bidding, scheduling, or operating behavior intended to harm system reliability or market efficiency. If the regulator identifies behavior that is detrimental to system reliability, and has clear evidence (for example, a whistleblower or internal correspondence) that the market participant engaged in this behavior with full knowledge that it significantly harmed system reliability or market efficiency, penalties may be imposed without first going through the administrative process to determine intent.

However, it seems very unlikely that the regulator would have direct evidence of intent, particularly if there is a market rule that imposes significant penalties on the market participants that have been shown to have engaged in this type of behavior. Enforcing a "behavior detrimental to system reliability and market efficiency" provision is more difficult if this market rule also imposed the very reasonable requirement that this detrimental behavior must also have a significant impact on market outcomes. This would require the regulator to make the often very subjective determination of what constitutes a "significant" market impact.

A key feature of this market rule is a transparent process for identifying intentional behavior detrimental to system reliability or market efficiency. This should include a process for taking the actions necessary to stop this behavior or the harm that it causes. The focus of this process should be on stopping as quickly as possible intentional behavior that the regulator determines causes significant harm to market efficiency and system reliability.

As should be clear from the above discussion, the major focus of this process is on eliminating the harmful behavior as soon as possible, not on assigning blame or imposing penalties. Only when public disclosure of the actions and the regulator's own investigation fails to stop or eliminate the harm associated with this behavior should the regulator attempt to determine intent and assign penalties for this behavior.

Coordinating antitrust and regulatory policy

We conclude with a brief discussion of how the industry-specific regulatory process should interact with the antitrust authority. The primary concern of the regulatory process is protecting against the economic harm associated with unilateral exercise of market power. Antitrust policy is concerned with detecting coordinated actions to raise prices and combinations (typically mergers) that result in a substantial lessening of competition. Antitrust law also prohibits attempts to monopolize, but this is unlikely to be relevant to the electricity industry beyond its implications for merger analysis.

The industry-specific regulator is the first line of defense for consumers against harmful market outcomes. While the industry-specific regulator may

wish to approve mergers, this seems redundant if the antitrust authority does a thorough review. Given the expertise of the industry-specific regulator, a thorough review would require that the antitrust authority to solicit extensive input from the industry-specific regulator, including the provision of industry-specific data that is part of the ongoing regulatory process.

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Electricity Market Liberalisation and Integration in the European Union*

Tooraj Jamasb and Michael Pollitt**

Electricity sector liberalisation is part of the wider trend toward liberalisation and the withdrawal of the state from involvement in infrastructure industries. The electricity liberalisation in the European Union (EU) is the world's most extensive cross-jurisdiction reform program of the sector and involves liberalisation of electricity markets in member states and integration of the national markets. The member countries include some of the world's pioneering countries (e.g. UK, Norway) as well as slow-reforming countries (e.g. France, Greece). In the absence of a centrally driven programme, the pace of reform in the EU would have been considerably slower.[1]

The electricity liberalisation trend in the EU is taking place amid a world-wide slow down in the pace of reforms. The California electricity crises in 2000–01 and the 2003 blackouts in New York and parts of Europe have dampened political enthusiasm for reforms. In Latin America, political and public support for reforms is on the decline. Elsewhere, apart from some leading countries such as the Nordic countries, Australia, New Zealand and Chile there has been limited progress towards comprehensive energy market reforms.

EU electricity reform is increasingly focused on market integration and cross border issues, signalling that it may be closer to realising a single market. However a single market requires physical interconnections and technical co-ordination between national markets and raises important issues regarding the framework within which market integration is implemented. While individual countries have made substantial progress toward liberalisation, the goal of a single electricity market remains a long way off. This paper reviews the state of electricity sector liberalisation in the EU and discusses the prospects for further progress towards an integrated European market in the light of the recent challenges facing the energy sector.

Electricity sector reforms

A successful liberalisation requires a suitable structure for wholesale and retail electricity markets, transmission capacity and ancillary services, independent oversight of competition, and regula-

Table 1

Main steps in electricity reform

Restructuring	• Vertical unbundling of generation, transmission, distribution, and supply activities.
	• Horizontal splitting of generation and supply.
Competition and markets	• Wholesale market and retail competition.
	• Allowing new entry into generation and supply.
Regulation	• Establishing an independent regulator. • Provision of third-party network access. • Incentive regulation of transmission/distribution networks.
Ownership	• Allowing new private actors. • Privatising the existing publicly owned businesses.

Source: Authors' compilation.

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[1] Unless otherwise specified, with the EU electricity market we generally refer to the EU-15 countries plus Norway and Switzerland (EU-15 + 2) as the latter countries are closely associated with the Union. The 10 Accession Countries are not included in this analysis.

tion of monopoly transmission and distribution networks. Experience from around the world has produced a measure of consensus over some generic reform steps for achieving a well functioning market-oriented industry (Jamasb 2006; Joskow 1998; Newbery 2002a). Table 1 outlines the steps for reforming a vertically integrated and publicly owned ESI into a competitive and privately owned industry.

The EU electricity liberalisation

Many of the liberalisation initiatives in Europe and elsewhere began in the early 1990s in an atmosphere of reduced concern over energy supply security. The ending of the Cold War made imports of gas from Russia less risky in an environment where markets favoured the building of new gas-fired plants. An initial surplus of generation capacity facilitated the reforms, as there was no pressing need to ensure guaranteed returns to new investment.

European level reform has been pursued via the EU Electricity Market Directives of 1996 and 2003 which: (i) required the members to take a minimum set of steps by key dates toward the liberalisation of national markets, and (ii) initiated efforts to strengthen the interfaces between national markets by improving cross-border transmission links and trading rules. The EU has also subsidised some cross-border transmission upgrades (e.g. between Ireland and Great Britain).

The Directives focused on unbundling the industry and the opening of national markets. The 2003 Directive further promotes competition by toughening regulation of access to networks, requiring independent regulators and regulation of cross-border trade.[2] The 2003 Directive required that all non-household customers could choose a supplier by 1 July 2004. By July 2007 it aims to achieve: (i) unbundling of transmission and distribution system operators (TSOs and DSOs), (ii) free entry to generation, (iii) monitoring of supply competition, (iv) full market opening, (v) promotion of renewables, (vi) strengthening the role of the regulator and (vii) a single market after a review to assess obstacles to the single market in 2006 (Table 2).

Key reform steps in the EU

Restructuring

The aim of vertical unbundling is to separate the potentially competitive generation and supply from the natural monopoly networks. Effective separation of generation from transmission is crucial for competition in the wholesale market and to ensure non-discriminatory access to networks. Unbundling can take the form of functional, accounting, legal, or ownership separation, the latter being the most effective. In turn, unbundling retail from distribution is important for retail competition. In Britain, following legal separation some distributors have left the retail business, as it removed the scope for cross subsidies, and non-integrated businesses have taken market share from incumbents.

The initial structural differences and the flexibility allowed by the first Directive have meant that the EU countries have adopted different approaches to separate these functions. Evidence suggests that vertical integration

Table 2

EU electricity directives

	Most common form pre-1996	1996 Directive	2003 Directive
Generation	Monopoly →	Authorisation → Tendering	Authorisation
Transmission Distribution	Monopoly →	Regulated TPA Negotiated TPA Single buyer	Regulated TPA
Supply	Monopoly →	Accounting separation	Legal separation from transmission and distribution
Customers	No choice →	Choice for eligible customers (=1/3)	All non-household (2004) All (2007)
Unbundling T/D	None →	Accounts	Legal
Cross-border trade	Monopoly →	Negotiated	Regulated
Regulation	Government → Department	Not specified	Regulatory authority
TPA = third party access.			

Source: Vasconcelos (2004).

[2] Cross border trading rules are also covered by an additional regulation 1228/2003 on conditions for access to the network for cross-border electricity exchanges.

Table 3

Extent of network unbundling

	Transmission system operator Score/5	Distribution system operator Score/5
Austria	4	3
Belgium	4	3.5[a)]
Denmark	4	3
Finland	5	1.5
France	4	1
Germany	4	1.5
Greece	1	0
Ireland	3	3
Italy	5	3
Luxembourg	1	1
Netherlands	5	3
Portugal	5	3
Spain	5	4
Sweden	5	4
UK	5	4.5
Norway	5	1.5

- TSO: Ownership unbundling, Yes=1, No=0; DSO: Legal unbundling, Yes=1, No=0
- Published accounts, Yes=1, No=0
- Compliance officer, Yes=1, No=0
- Separate corporate identity, Yes=1, No=0, Often=0.5
- Separate locations, Yes=1, No=0, Partly=0.5

[a)] Brussels region not yet legally unbundled and no compliance officer in Flanders region.

Source: Based on European Commission (2005).

between generation and retail has a strong commercial rationale as supply risks in the generation can be insured against by integrating into retail. Table 3 shows the extent to which member countries have separated networks from competitive activities using the five best practice criteria. In many countries the separation of TSOs has been more stringent than for DSOs, as most have implemented ownership or legal separation rather than accounting or management separation.

Competition

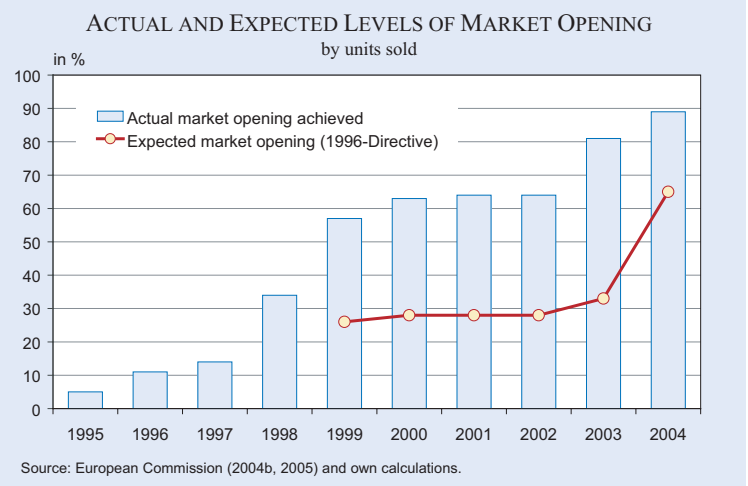
Effective competition may require horizontal unbundling of generation and retailing to reduce market concentration. The Directives do not require horizontal separation to control market concentration. However, in order to meet market opening rules, ENEL of Italy (30 percent state-owned) was required to sell off 15,000 MW capacity and EdF of France auctioned some 6,000 MW capacity (42 TWh energy) per year. In England and Wales the largest generators were obliged to divest part of their plant portfolio to other firms and later traded horizontal divestitures for the right to integrate into supply. In several significant European markets, competition cannot be expected to operate without (further) horizontal structural changes (e.g. in France).

Despite a mixed ownership structure, wholesale competition is, at least in principle, complete in all member countries, and large users and many small consumers can freely choose their electricity suppliers. The 2003 Directive raised the standards for competition by ruling out the single-buyer model for distribution utilities (adopted by Northern Ireland, Portugal and Italy) and requiring regulated third-party access to distribution networks. Some countries have exceeded the minimum required levels and have already extended market opening to households (Figure 1).

Regulation

While regulation can oversee a competitive sector, it is difficult to engineer drastic changes after initial restructuring. The regulator should seek to minimise regulatory uncertainty by establishing credible governance rules. Where competitive and regulated activities remain integrated, the regulator must ensure that generators and retailers have non-discriminatory third party access to networks. Network charges typically constitute around one-third of final prices but vary by over a factor of two across the EU, signalling a potential for efficiency improvement. Advances in regulation theory and practice attempt to mimic market competition and several European regulators have adopted various incentive-based

Figure 1



Source: European Commission (2004b, 2005) and own calculations.

schemes for regulation of networks using price caps and benchmarking (Jamasb and Pollitt 2001).

Contrary to best practice advice of ex ante establishment of independent regulators, the EU's focus on raising the standards of regulation came after the restructuring drive. As a result, many European regulators are weak in the face of established incumbents. In Germany, despite full market liberalisation, the regulator first took office only in July 2005. With no independent regulator in place and a lack of incentive-based regulation schemes, the network charges in Germany have been among the highest in Europe. Recognising the importance of regulation, the 2003 Directive required establishment of independent regulators.

Privatisation

The perceived benefit of privatisation is that the pursuit of profit leads to increased efficiency. Privatisation can also provide significant proceeds for the government and reduce its future liabilities (Newbery and Pollitt 1997). Evidence suggests that privatisation can deliver benefits when combined with effective restructuring, competition and regulation (Newbery 1999; 2002a). However, privatisation is not a prerequisite for liberalisation. In Norway, competition and incentive regulation were applied to state, county and municipality owned enterprises.

Privatisation has not been part of the EU's drive toward liberalisation. While the political rationale for avoiding sovereign issues and delays is understandable, state ownership of dominant incumbents (e.g. in Norway) can be conducive to competition. In some countries, this has been resisted partly because of fears of national companies falling into foreign ownership (e.g. The Netherlands and Norway). In Germany and Belgium, the industry was largely privately-owned before reform. The most extensive privatisation programs have taken place in the UK and Portugal, while some countries have undertaken partial privatisation (e.g. Italy and France).

Effects of reform

Market structure

While some outcomes of reforms can be difficult to measure, the impacts on market structure have been easier to observe. The financial integration of electricity markets in Europe has taken place more rapidly than the integration of power flows and networks. In the absence of strict control of Mergers and Acquisitions (M&As), European firms have shown a marked tendency towards consolidation and market concentration at national and EU levels (Newbery 2002b; Codognet et al. 2002). This may in turn limit the effectiveness of competition.

Horizontal concentration

The legacy of pre-reform public ownership and centralised control through national companies (e.g. in France, Portugal, Italy, Greece and Ireland) has ensured that horizontal concentration remains high in many countries. While some reforms have led to reduced concentration in generation and retailing (e.g. England and Wales, and the Nordic market), they remain exceptions rather than the norm. Among the EU-15, concentration in generation for the largest three generation firms remains above 60 percent in 10 markets (by installed capacity). In retailing there is a similar picture with the three-firm concentration ratio remaining above 60 percent in 12 markets (by number of customers).[3]

European utilities have been keen to position themselves in the emerging market and have moved more quickly than national and European decision-makers. Some acquisitions have involved considerable premiums reflecting the acquiring firms' expectations. More than two-thirds of the European market is owned by eight large companies, with the Europe-wide four-firm concentration ratio at 50 percent. The ownership structures are complex and include many partial shareholdings. Moreover, inter-fuel competition between gas and electricity seems to be beneficial for the single energy market, and therefore the merger tendency between gas and electricity firms can restrain competition.

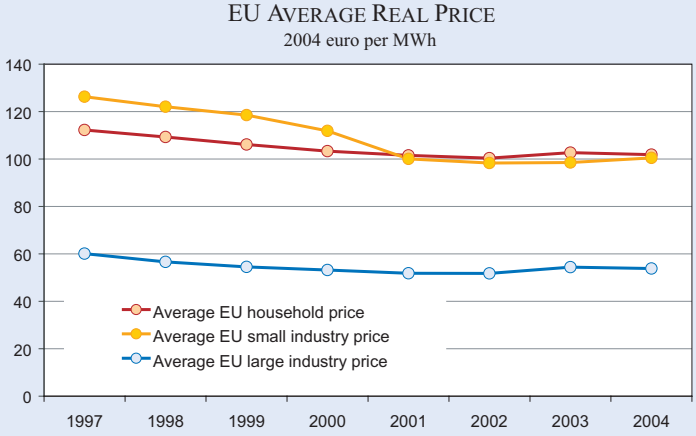
Vertical integration

In pre-liberalisation electricity sectors, vertically integrated structures had apparent economic and technical advantages and were a convenient organisational arrangement for state-owned sectors. While reforms have attempted to reduce this, profit-oriented and privatised utilities have exhibited tendencies toward vertical (re)integration through domestic and cross-border M&As. Vertically integrated electricity utilities

[3] Concentration figures are from European Commission (2005).

have been among the most active in European M&As and have tended to acquire other vertically integrated companies (Codognet et al. 2002). In Great Britain, the retail margin appears to have increased with higher concentration resulting from M&As as the number of national competitors in supply has fallen and the degree of integration between generators and suppliers has increased.

Figure 2



Source: European Commission (2005, 2004b) and inflation rate (unweighted).

Despite the obvious problems associated with increased market concentration, national and supranational regulators have been relatively inactive in tackling the issue (Thatcher 2002). The desire to create national champions may have constrained intervention to create a diversified ownership structure. Also, M&A decisions are usually the responsibility of national competition agencies, and it is not clear that these agencies are sufficiently aware of the dynamics and complexities of electricity markets. A competent energy regulator is needed to provide clear advice on such cases (Newbery 2004).

Sector performance

Electricity prices

The effect on electricity prices is, perhaps, the single most important indicator of liberalisation. A desirable outcome for the single market is to achieve lower average EU-wide tariffs and price convergence through wholesale and retail competition.

A decline in the price-cost margin may suggest efficiency gains and that these have been passed on to customers. Liberalisation may also involve rebalancing of tariffs for different customer groups as a result of cost-reflective pricing. The picture is further complicated by changes in prices for gas, oil and coal. There is a significant variation in end-user prices in the EU, although this can be associated with different components of the final price (European Commission 2004b). The integrated Nordic market exhibits higher degree of wholesale price convergence than other European markets reflecting limited interconnection capacity (Boisseleau 2004; Bower 2002). Italy and Ireland exhibit notably high generation prices and retail margins.[4] At the same time, Norway and UK (with the longest incentive regulation of networks) have some of the lowest network charges. The UK exhibits the lowest retail supply cost and margin.

The EU average prices for major customer groups have seen a general decline between 1997 and 2003 (Figure 2). The price reductions for households, small industries and large industries have been 6, 20, and 9.5 percent respectively. Prices for the customers seem to have come more in line with the underlying costs of supply, which would suggest that residential prices should be higher than those of small industries. This has arisen against a background of flat or rising fossil fuel prices for electricity generation over this period.[5] It also comes at a time when operating costs seem to have been falling, combined with sharp declines in employment in recent years. Labour productivity in the utilities (including electricity) sectors has increased by about 30 percent between 1996 and 2001 (European Commission 2004a).

Distribution tariffs vary significantly, although less than for transmission tariffs (the distribution charges in Germany are twice those in the UK and explain more than half of the differential in the final prices between the two countries). There are also significant variations in distribution tariffs within individual countries that reflect legitimate cost variations, inefficiency, the use of distribution charges as local taxes by municipal owners, or even joint cost allocations within vertically integrated businesses cross-subsidising competitive segments such as retailing

[4] Generation fuel taxes vary across countries (see IEA 2004).
[5] There is only patchy data available on fossil fuel prices on a consistent basis (see IEA 2004).

from monopoly segments. Incentive regulation has led to concerns about the effect on the quality of service, which exhibits variations both across and within countries (CEER 2003). However quality of service is usually explicitly incentivised.

Investment adequacy

In the absence of central planning, the market must deliver sufficient and timely investments – a major concern in liberalised electricity markets. Assessing the incentives for future investment adequacy is difficult due to pre-existing over-capacity. However, over time, as demand and supply move more into balance, new investment with the promise of an adequate return will be needed. A period of high demand growth and sustained under-investment can eradicate the existing reserve capacity and threaten the stability of the system, especially where this is combined with a lack of political will to allow prices to rise.

It is expected that the financial and physical integration of the European electricity market would cause its profitability to converge. It is more difficult to determine whether the return is at an efficient level and whether it will lead to sufficient new investment. In Norway, in recent years, the return on capital for electricity utilities has been lower than that of the manufacturing industries (von der Fehr et al. 2005). This gives rise to the question as to whether electricity is less risky than other industries, thus justifying lower returns. Meanwhile, much of the electricity infrastructure in Europe is aging and there is a need for significant asset renewal in coming years. Given the long economic life of such assets, it is important to ensure the efficiency and strategic value of the new investments.

Security of supply

Figure 3 shows changes in the remaining capacity in the Union for the Co-ordination of Transmission of Electricity (UCTE) system, which consists of the transmission networks in continental Europe between 1999 and 2003. Overall, reserve capacity in the post-liberalisation year appears to have been relatively stable. Reserve capacity for the period between May and July 2003 is somewhat lower than previous years. With the exception of February, the reserve capacity for the colder months of the year has generally improved. We note that this data is rather crude and does not include intra-month peaks or reflect variations in the likelihood of an outage at the same measured reserve margin. A better measure would be given by the loss of load probability.

In the short run, increased trade and interconnections can improve utilisation of existing capacity. Individual countries can maintain a degree of domestic energy security by limiting reliance on import dependence. The best insurance policies against interruptions in energy flows are national reserve policies and effective EU-wide crisis management and sharing of reserves.

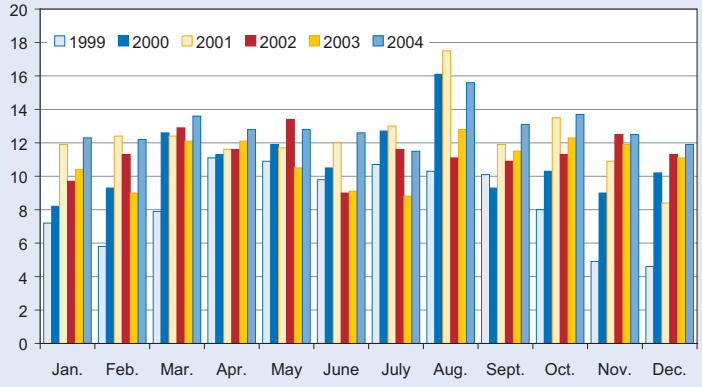
Environmental and social impact

Between 1992 and 2001, the share of renewables as a percentage of targets for 2010 in seven countries declined or remained the same. For the whole of the EU during the same period, the share of renewables increased to about 10 percent (European Commission 2004a). However, progress towards target levels has been uneven and the European market integration does not appear to stand in the way of different national emphasis on renewables. The trade-off between achieving lower prices through reforms and environmental concerns about demand growth may be reduced by low carbon and clean technologies.

Between 1996 and 2001, EU electricity prices have consistently increased at a lower rate than the con-

Figure 3

REMAINING CAPACITY WITHOUT EXCHANGES AS PERCENTAGE OF TOTAL GENERATING CAPACITY IN UCTE



Source: UCTE (1999, 2000, 2003, 2005).

sumer price index. During this period, the affordability index for electricity improved for all income groups in most member countries and consumers appear to be generally satisfied with service quality (European Commission 2004a). Recent increases in fuel prices have ended this benign period of declining real prices. The ability of regulators to pass efficiency gains from liberalisation to customers will be increasingly important for continued public acceptability of further integration of European markets.

Conclusions and policy implications

The centralised approach to market liberalisation in the EU has succeeded in maintaining the pace of reform in the original EU-15 and in a number of associated and accession countries. Given the initial diversity across EU electricity sectors, the Directives have achieved a degree of standardisation of structures, institutions and rules in national markets. Market opening has proceeded rapidly and in many cases, beyond the minimum requirements.

While progress toward a genuine single market remains slow there has been progress in regional markets. There are several recognisable regional markets in the EU: the Nordic, UK-Ireland, Baltic, east European, west European, southeast European, Iberian and Italian zonal markets. However, these markets vary in degree of internal integration. The Nordic market is the most advanced with formal and common market rules and price convergence, while the Iberian market is taking shape. The west European market (including France, Germany, Switzerland, Netherlands and Belgium) is the largest regional market, and its central geographic position implies that progress toward the single market depends on the development of this market.

Liberalisation and integration of the European market remains a work in progress characterised by uncertainty over its end point. Effective unbundling, regulation and competition are required for a competitive market. This requires that decision makers need to take action to:

- promote extension of regional markets,
- encourage expansion of interconnector capacity to facilitate cross border competition,
- unbundle networks and regulate and enforce accesss arrangements effectively,
- block anti-competitive rises in concentration via mergers,
- develop arrangements to secure a collective reserve capacity and to prevent free-riding, and
- enforce disclosure, transparency, and the collection and publication of new types of data that would allow proper monitoring of liberalisation progress.

Decision makers must make sure that market incentives are allowed to work in order to avoid a return to monopolies of the past. The process of referring merger cases to competition authorities has been ineffective in preventing market concentration. Many of the required measures can be left to national governments/regulators, but where these do not take sufficient action the European Commission must have the authority to intervene to achieve a genuine European single market in electricity.

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Lessons from Liberalised Electricity Markets*

Ulrik Stridbaek**

Over the past decade, several IEA member countries have embarked on a policy focusing on market liberalisation of the electricity supply industry. Pioneers in electricity market reform have now been operating with considerable success for a number of years, delivering substantial benefits to a variety of economies. Finding the most effective way to develop competitive electricity markets that fulfil the goals of real economic benefits has not been clear, however. Scepticism and concerns are voiced in many countries, and debate continues on several key issues. The sceptics point to the California crisis and market breakdown in 2001 and the subsequent, spectacular bankruptcy of Enron. The widespread blackouts in North America, Italy and Scandinavia in 2003 are also sometimes used to argue that electricity market liberalisation is a failed concept, an issue addressed in a recent IEA publication, *Learning from the Blackouts* (IEA 2005b).

While the public has focused on the remarkable failures of the past decade and the slow progress in some countries, several electricity markets have been operating successfully and have developed into robust markets during the same period. These include the UK, the Nordic, the Australian and the Pennsylvania-Jersey-Maryland (PJM) markets. In all IEA member countries, the liberalisation process has progressed at varying speeds. Despite the fact that no straightforward path to success has emerged, there is a general lesson to be learned: electricity market liberalisation is not an event. It is a long process that requires strong and sustained political commitment, extensive and detailed preparation and continuous development to allow for necessary improvements while sustaining ongoing investment. It is, in fact, a process that has not yet been completed anywhere in the world – nor will it be in the foreseeable future.

Electricity market liberalisation delivers long-term benefits

Traditionally, electricity sectors developed and operated within strictly regulated frameworks in which vertically integrated utilities have handled most or all activities – from generation to transport to distribution. Moreover, it is a centrally planned activity, wherein needs are assessed and fulfilled by electricity system planners and all associated costs are passed on to consumers.

But traditional, vertically integrated utilities tend to create substantial overcapacity, a fact that became more obvious when electricity demand growth slowed during the 1980s and 1990s in many IEA member countries. In addition to reducing this overcapacity, liberalisation has also been shown to provide large potential gains from improved efficiency in the operation of generation plants, networks and distribution services.

Monitoring of electricity rates paid by different customer classes is one basic way to assess the performance of liberalised electricity markets. Indeed, many countries promised falling prices prior to launching liberalisation processes. Retail prices have indeed decreased in real terms, but prices paid by consumers do not necessarily reflect the costs of producing and transporting electricity. Some consumer groups often subsidise other consumer groups. Different parts of the value chain – from the recovery of fuels to generation and transport of electricity – are also often subsidised in one way or another, or are not fully cost reflective for other reasons. Electricity rates and taxes are often related in non-transparent ways. Changes in fuel costs and environmental regulation affect final costs of supplying electricity and seem to be important drivers for recent increases in electricity tariffs in many, particularly,

* This paper summarizes the main points and conclusions of the IEA publication "Lessons from Liberalised Electricity Markets", IEA (2005a).

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European IEA member countries but are not directly related to the effects of electricity market liberalisation. In addition, investment decisions made within a vertically integrated industry influence electricity costs for a long time, hence the effects of past investment decisions will be reflected in retail prices for several years to come. All in all, these factors make electricity retail prices paid by end-users complex to interpret.

Examining performance in various specific segments of the value chain paints a clearer picture. Existing plants are now used more efficiently. At the same time, fundamental changes in the use of transmission assets has created more dynamic and enhanced usage, often resulting from increased trade across jurisdictions. Other indicators show marked increases in labour productivity.

A recent study by the Organisation for Economic Co-operation and Development (OECD) explores the benefits of liberalising product markets and reducing barriers to international trade and investment across several regulated sectors. It singles out electricity as one of the sectors with the greatest potential for improvement. The results of the analysis assess the total annual benefits across all sectors to be 1 to 3 percent of GDP in the United States and 2 to 3.5 percent of GDP in the European Union (OECD 2005).

Perhaps more important are the dynamic effects, for example, from an improved interaction between many diverse resources including coal, natural gas, nuclear, hydro, wind power and demand resources. As liberalised markets begin to mature, it becomes more obvious that a centrally planned and vertically integrated approach is less appropriate for a more diverse system and is, in fact, likely to be a barrier to the innovation necessary to meet the needs of the future.

For the moment, it is crucial to avoid being overly short-sighted in the assessment. Liberalisation is expected to bring large economic benefits for consumers and societies in the long term and evidence so far indicates that markets can deliver these benefits. But in the short term certain groups may not realise immediate benefits or may even experience losses. Without question, one of the most crucial policy challenges facing decision makers is the management of social and equity issues in distributing the benefits of electricity market liberalisation.

Government has a critical but fundamentally changed role

Regardless of the approach to liberalisation, the process requires strong government involvement. In fact, the level of on-going political commitment significantly influences the outcome. In the absence of clear signs of commitment, regulatory uncertainty may well become self-fulfilling and undermine a positive outcome. From time to time, all electricity systems will experience a crisis. Such crises have become important tests of the robustness of liberalised electricity markets and, perhaps even more importantly, of the robustness of the political framework backing the liberalisation process. At difficult junctures in market development, strong political commitment – often expressed by *not* intervening – can create the necessary market responses.

Effective markets are fuelled by competition. Thus, one of government's most decisive roles is to establish a framework that allows for the development of effective competition. The first step required to introduce competition is to break down the monopolies that exist in traditional vertically integrated utilities. It is necessary to separate network activities from all other activities, either through legal unbundling of the network entities or, more effectively, through true ownership unbundling. The key is to introduce competition in as many parts of the value chain as possible – from generation to consumption. Remaining natural monopolies (e.g. networks and system operation) should be subject to continued and improved economic regulation.

Unbundling effectively breaks up the centralised decision-making process found in vertically integrated utilities, replacing it with a decentralised process where market players make decisions within markets. This can only work smoothly when markets are "effective", but effective markets do not develop automatically. Creating a level playing field and developing effective, competitive marketplaces requires establishing detailed market rules, design and regulation. Within the on-going liberalisation processes, the level of government involvement through detailed legislation and rule-making has varied. But it is evident that governments are critical to establishing a framework with the necessary incentives. At the same time, independent regulators are one of the critical bodies within this framework; their role in overseeing compliance with legislation and ensuring fair and efficient economic regulation

of networks is fundamental to successful market development.

Real-time system operation is an aspect of the electricity sector that is maintained as a natural monopoly and, thus, should be unbundled from other competitive segments of the value chain. Market rules, design and regulation aim to direct all actions transparently, but many subtleties remain in secure, day-to-day system operation. For example, system operators will preserve certain discretionary powers, regardless of careful efforts to regulate grid access. Their independence is particularly critical to the creation and further development of well-functioning and robust markets.

In the new decentralised industry structure, transparency is a prerequisite for developing competitive liberalised electricity markets. Competitive market players do not automatically (or voluntarily) collect and publish fundamental market data and statistics. Therefore, it is important to redefine responsibility for this necessary task in liberalised markets. Increased transparency is a proven, strong instrument to ensure continuous development towards more effective markets. In fact, transparency adds to the benefits of liberalisation in its own right, by improving the decision-making framework for all actors – policy makers, industry and consumers alike.

But a formal framework that allows for competition and creates a level playing field is not enough. Competition will flourish only if multiple players compete in the market. Governments and regulators have managed to enhance competition through various means, but a high level of market concentration remains a serious concern in several markets. Effective markets and transparency have been vital to easing access for new-comers. In addition, extending markets across countries and regions helps enable the "import of competition"; this is particularly important in smaller jurisdictions in which the need for consolidation limits the number of market players that can operate efficiently. To date, achievements are more limited in *ex post* regulation of competition. It is illegal to exercise market power, but it often remains difficult to prove such behaviour. In some cases, dealing with market power abuse is further complicated when the largest companies are regarded as national champions or provide substantial revenue streams to their public owners.

Some claim that market failures are inherent across the value chain in electricity markets requiring government intervention. But, upon closer scrutiny, many alleged failures turn out rather to be the result of regulatory failures. In the event of real market failures – as might arise from concerns about reliability of supply and the environmental impacts of electricity production – governments may be called upon to intervene in more active ways.

Unbundling the electricity sector has also called for an "unbundling" of the concept of reliability of supply into its relevant parts of the value chain. Concern has been voiced about secure supply of fuel for power generation, adequacy of investment in generation and network assets, and the security of real-time system operation. When it comes to the latter, markets so far have failed to provide a complete framework of incentives without jeopardising system security. Government intervention is necessary, and this has been carried out (rather effectively) through the establishment of truly independent system operators and a regulatory framework for system security.

The environmental effects of electricity generation are not addressed by normal incentives in competitive markets. Environmental benefits are classical public goods and their value will not be taken into account by competitive market players. Policy intervention is needed to ensure they are properly taken into account. Policies motivated by environmental and climate change concerns are already having serious impacts on liberalised electricity markets, as was intended.

Many environmental policies are, however, potentially distortive beyond the initial intent, particularly when looking across internal markets within the context of international competition. Direct financial support for particular technologies, or non-transparent barriers that block development of others, can lead to inefficiencies and distort competition. This adds uncertainty to the investment decision process and ultimately poses a threat to the system. In several liberalised electricity markets, the preferred option to address this issue is implementation of cap-and-trade policies. This approach transforms the political goal into an obligation imposed upon market players. Market players are then left to fulfil the obligations in ways they consider optimal, including trading the obligations amongst themselves.

Price signals are the glue

In the process of unbundling utilities to introduce competition, vertical integration has been replaced with markets comprising multiple players. In this new framework, price signals direct decisions in the marketplace. Efficient decisions depend on correct signals, i.e., price signals that reflect the real costs, benefits and values of producing, transporting and consuming electricity.

Electricity has a value to the consumer only if it is supplied at the right place, at the right time, in the right volume and at an acceptable quality. The locational aspect of electricity pricing is the most controversial and complex issue in efficient pricing. Principles that establish a price for each node in a system are the ideal reference because they value electricity based on where it is generated and delivered thereby giving full transparency, and some markets come close to achieving this. However, there are important trade-offs to consider when choosing pricing principles that could justify a less fine-tuned, zone-based system, where a price is established for several nodes that are rarely congested. Even though there are important trade-offs, the main controversy often relates more to social equity and distribution rather than specific pros and cons of market functioning and system operation. Nodal pricing evolved as a necessity in highly meshed networks where transmission lines are criss-crossing the electricity system (e.g. North America); zonal pricing is accepted as a good approximation in more radial networks, where the structure of congestion is less complex (e.g. Australia). Higher transaction costs and the greater complexity of nodal pricing are often used to argue for pricing principles that are less reflective of location. In reality, evidence shows that obvious congestion points have often not been priced appropriately. The highly meshed network in continental Europe is currently developing into a zonal market, often with entire countries constituting one zone, thereby potentially blurring price signals and inhibiting efficiency.

Open trade across jurisdictions is one of the classical merits of liberalised and competitive markets. It enables exploitation of comparative advantages – at mutual economic benefit for all regions involved. Electricity generation and transport include many factors related to resource endowments, geographical characteristics and regional skills. But trade across jurisdictions relies on co-operation amongst system operators. Therefore, independence and appropriate incentives of system operators are critical in the development of cross-border trade.

Electricity consumption and supply are inherently volatile. But the volatility is an inseparable characteristic of the service and is not related to the organisation of the sector. Liberalised electricity markets create a more transparent framework, allowing for cost-reflective pricing that depicts this volatility. In some instances, government interventions to suppress volatility and cap prices below what can be justified by economic reasons have blurred price signals and slowed market responses.

Price volatility creates risks for market players, including generators and consumers. Risks are the result of uncertainty, and there is considerable uncertainty connected with many of the fundamental factors that determine electricity generation, transport and consumption. In the previous model of a vertically integrated and regulated sector, all costs – and, therefore, all risks – could be passed on directly to consumers. Liberalised markets make risks more transparent and, more importantly, reallocate these risks to the decision makers themselves.

In liberalised electricity markets, business risks can be effectively managed through contracts. Generators, retail suppliers and consumers can agree on prices, volumes, times and other conditions that create the desired certainty within the framework of the contract. In fact, liquid and effective markets for financial contracts improve competition by enabling sophisticated risk management. This, in turn, eases market access for new and smaller market players and contributes to ensuring that market power is not exercised. Most markets provide a framework for a liquid market in the day-ahead and real-time segments through market rules and design. In some markets, relatively liquid and effective financial markets for longer-duration contracts are developing, but the evolution of these markets remains a major concern.

Empowering the consumer

Vertically integrated utilities naturally focus on the supply side of the electricity sector, concentrating on the two pillars of electricity generation and transport. Until now, consumers paid the bill, and no infrastructure was in place to involve them in deci-

sion-making processes. Liberalised electricity markets introduce a third pillar that allows consumers to become active participants. Effective markets allow consumers to exercise their right to switch suppliers, thereby enhancing competition for better services and increased innovation. Perhaps more importantly, consumer response to prices adds real resources to the system, potentially saving expensive generation or transmission investment and improving reliability. Finally, improved transparency from cost-reflective prices provides clearer incentives for more efficient energy use. This new third pillar is a product of the recent liberalisation process. While the framework for consumer participation now exists, many of the detailed structures needed to facilitate ease of participation must still be further developed.

A first building block to empower the consumer to participate is to create the necessary competitive pressure. Such pressure creates the incentives needed for retail companies to bring the opportunities of a competitive wholesale market to the doorsteps of consumers. Unbundling of competitive retail activities from network activities is the most important step to introducing effective retail competition, but in most cases this phase of liberalisation has been less comprehensive than in transmission and system operation. Regulated access is provided by constructing systems and formal rules for consumer switching, but many markets still have small, but possibly decisive, barriers to switching – or still offer advantages to incumbent semi-integrated retail and network businesses. In all competitive markets, larger industrial consumers have switched in great numbers. The experience for smaller commercial and residential consumers is more varied, ranging from high switching rates in some markets to disappointingly low rates in others. In jurisdictions with liquid financial markets, more sophisticated retail products have been developed to better serve the needs of consumers who want to take an active role in managing risks. However, overall product innovation and development has been slow and sporadic. Establishing competitive retail markets that provide easy access to switching between competing retailers remains a challenge.

Another effect of the somewhat slow development of competitive and innovative retail markets and the still often supply-focused market design is the failure to bring market prices to the doorsteps of consumers. So far, there has been only limited opportunity for consumers to create benefits by shifting load as a price response. Considering that electricity is consumed by millions of different consumers for millions of different purposes, consumers are undoubtedly, in principle, willing to shift demand by varying degrees as a response to different prices. Demand is price-elastic: the challenge is to lower transaction costs sufficiently to justify participation for consumers who stand to realise the largest potential benefits. There are several barriers to enabling demand response to price but that being said, there must also be something to respond to: consumers cannot be expected to respond before prices rise sufficiently to off-set transaction costs. The largest consumers, who already have remotely read interval meters, are likely to be the first to see the benefits of shifting demand in response to price. Finding a way to take the wholesale price to the doorsteps of smaller commercial and residential consumers is, however, fraught with a technical and economic barrier given the absence of necessary metering equipment.

Lack of demand participation remains one of the most serious challenges in liberalising electricity markets. The barriers are numerous. Creating easy and effective systems to manage retail switching is challenging. For small residential consumers, the infrastructure to enable switching is relatively costly compared to the potential benefits. In addition, it has been difficult to remove all distortions from semi-integrated networks and retail companies. Where governments show a willingness to intervene through price caps and other means, this also serves as a barrier to demand participation. Finally, lack of liquid financial markets makes it difficult to create the necessary innovative products. However, early evidence shows that consumers do switch suppliers and do respond to price when the conditions are sufficiently good. In fact, remarkably little demand response to price is necessary to significantly improve the performance of electricity markets, enhance system security and substantially reduce volatility and electricity prices for all consumers.

Efficient incentives for investment are critical

A substantial share of the electricity consumer's bill goes towards financing generation and network assets. The opportunity to improve investment decisions is a significant potential benefit of market liberalisation. The ability of electricity markets to provide sufficient incentives for timely and efficient investment in generation plants continues to be one of the most debated aspects of market design. Many

investment projects require long lead times and have an economic lifetime of several decades. The transitional phase of market development is characterised by uncertainty that may undermine the investment climate – and ultimately the successful transition to a competitive market. Investments in power generation are one of the big tests for the development of robust markets.

Liberalised markets create a new investment paradigm in which decisions are taken under competitive pressure. When risks are shifted from consumers to decision makers, capital-intensive technologies with long construction times are viewed with greater scepticism – even if marginal costs are low. In the new competitive environment where risks are transparent, market players prefer technologies with short lead times that can be built in small incremental steps. Competition also pushes investment decisions to the last minute, which saves resources but can also put policy makers under pressure to intervene in a transitional phase (i.e. before the process has proven to be robust).

In situations where the supply and demand balance is tight, demand response to price can constitute the necessary buffer of last resources and add much-needed flexibility. To date a certain level of active demand participation has been critical in re-affirming the robustness of markets; conversely, lack of demand participation has laid the groundwork for very high price spikes needed to trigger investment. When governments have refrained from intervention and let prices reflect real costs, markets have delivered – they have not failed to provide incentives for a response through investment in new generation capacity. In this context, so-called "energy only" (or, more correctly, "one price only") markets, in which the wholesale electricity price provides remuneration for both variable and fixed costs, have performed well.

Some markets have not shown enough confidence to rely on the delicate balance inherent in this new investment paradigm. These markets assume that consumers are not willing to participate and thus find that protective price caps are necessary as a consequence. However, with the barrier of a price cap, extra incentives must be added to prompt timely and adequate investment. These extra capacity measures have been implemented in various forms and have incentivised new investment. But they have also been prone to market manipulation. Another drawback is that capacity measures force decisions regarding the overall need for new generation capacity back into a centralised decision-making process.

Investments in networks are, by and large, still being made within regulated frameworks. The business model for merchant lines has proven to be fragile, and very few merchant lines are currently financed by purely commercial means, but locational pricing has still added substantial transparency to the process of making investment decisions in transmission. For example, several markets are developing information systems that enable a more co-ordinated interaction between decisions on regulated transmission investments and decisions on investments in generation plants.

It is important to design markets and create regulatory frameworks that provide sufficient remuneration and incentives for efficient investment. But none of this makes any difference if investors cannot get permission to build. The absence of transparent and smooth approval procedures – whether to use a particular technology or to site a new generation plant or network at a particular location – continues to be a serious barrier to investment in most markets. This is not related to the liberalisation of electricity markets; rather, cost-reflective locational prices make the consequences of related environmental policies and the so-called "not in my back yard" (NIMBY) syndrome more transparent.

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Regulation of the Electricity Market in Germany

From regional monopolies to competitive markets

Volker Heck*

The supply of electrical energy is a segment of the economy that has traditionally been subject to numerous interventions by the state. The basis for this is the opinion that supplying electricity is a vital public service that should not be exposed to the risks of the market. Therefore, electricity was provided solely by state-run monopolies or strictly regulated private regional monopolies throughout the world until the late 1980s.

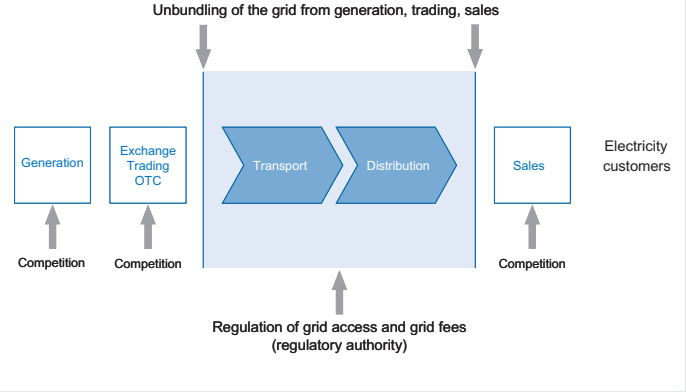
To the extent the concept of competition as the predominant governing principle gained acceptance in the 1980s with deregulation policies in the United States and, above all, Great Britain, governments also examined the extent to which supplying energy could be subjected to the laws of the market in order to reach energy and environmental policy goals more efficiently through competition: Market-oriented competition was to supply consumers at the most favourable terms. It is undisputed that electrical grids can be viewed as a natural monopoly, since electricity is an energy source that must be transmitted over lines. The construction of parallel lines for the purpose of competition between networks is generally unreasonable from an economic standpoint. Conversely, however, the other levels of the value chain – generation, trading, sales – must be opened up to competition. To ensure competition in these segments and prevent grid operators from abusing their monopoly positions, regulation of prices and services provided over the electrical grid is necessary (Figure 1).

Internal market as prelude

These realizations are increasingly being accepted in European policy, too. As an essential component on the path to a unified European internal market – which was contemplated in the treaties founding the European Union – the EU Commission tackled reform of the regulatory framework of the European electricity and gas industry in the nineties, using the energy market reforms in Great Britain, Norway, and later in the other Scandinavian nations as a model. Even though the common goal was "more competition in the energy markets", the reform had to take into account the differing initial situations in the individual EU countries. Thus, in France and Italy about 90 percent of electricity consumption by end users was attributable to a single company in each country, whereas in Germany, for example, a pluralistic structure predominated with regional monopolies covered by anti-trust laws. Other markets were already organized around a competitive model: England and Wales introduced a wholesale

Figure 1

General Principle for Liberalization of Electricity Market



Source: RWE.

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market with a pool-system in 1989 and broke up the heretofore vertically integrated energy utilities into various energy generation and sales companies (which were then privatized) and a grid operator (which was later taken public). Norway followed in 1991. There, too, the state power supply companies were broken up into a grid company (Statnett) and a generation company (Statkraft). Later a power exchange was set up in Oslo (NordPool 1993). In the years that followed, Finland (1995) and Sweden (1996) took similar steps to reform their electricity markets, which were expanded by the entry of these countries into the Norwegian power exchange system. The development of all these markets was oriented toward the same model: the abolition of regional or national monopolies by opening up generation markets to competition, free access to the grid for third parties, a free choice of supplier by consumers and the establishment of wholesale markets for electricity.

In view of the structural differences, it was not possible to harmonize the systems of liberalized markets with those of countries still closed to competition within a reasonable period of time. This meant that only general, omnibus legislation – which enabled individual countries to pursue different methods of implementation and market organization while maintaining the common goal – made sense with respect to liberalization and deregulation at the European level.

After four years of tough negotiations, the European Council and the European Parliament adopted the first Directive on the Internal Market in Electricity in 1996, based on Art. 95 of the EC Treaty. It took effect on 19 February 1997 and was to be transposed into national law within two years. The main requirement was to take steps to open national electricity markets to competition. In the first step in 1999, 23 percent of the market was to be opened up; by 2000, this limit was to be expanded to 28 percent and by 2003 to at least 33 percent. These threshold values represented minimum values, which could also be exceeded by the individual member states under the principle of subsidiarity by selecting the customers eligible for competition. In addition, the Directive governed the organization of grid access, the separation of the grid from sales and generation in terms of management and accounting, and free access to generation and line construction. Thus, the markets that had already been liberalized acted as models for development of the Directive. However, diverging from this, the Directive permitted three systems for organizing grid access: regulated access, negotiated access and the single buyer system.[1]

The first phase of German electricity market reform

The energy law in effect before the implementation of the Internal Market Directive in Germany dated from the year 1935 and placed the private sector electricity industry under state supervision. Major components of this law included a requirement that electricity suppliers obtain permits before commencing operations, an obligation to supply electricity to all customers and the establishment of closed supply areas. These regional monopolies, which were based on an exception in the Act against Restrictions on Competition, were negotiated in license agreements with municipalities in exchange for the payment of license fees for the use of public roads. In addition, the tariffs for supplying small customers were subject to state regulation. Special agreements were made with large buyers and policed by the Federal Cartel Office for abuse.

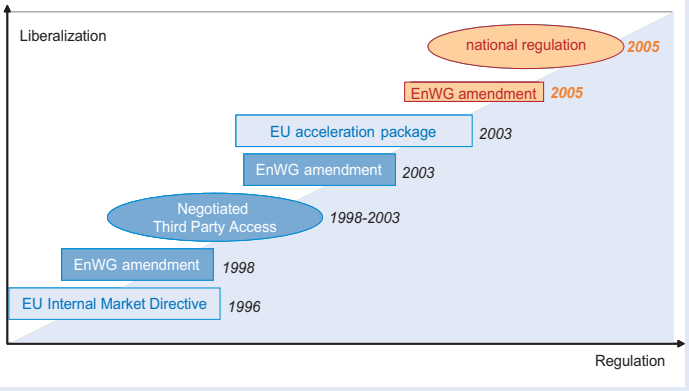
The EU Directive on the Internal Market in Electricity required a fundamental revision of existing energy law. The Energy Industry Act [Energiewirtschaftsgesetz], which took effect on 29 April 1998, required energy supply companies to grant other companies access to their networks in a non-discriminatory manner (Figure 2). There was no requirement to unbundle the current vertical integration of companies into generation, transmission/distribution and sales companies. These segments merely had to be shown separately in accounting records. At the same time, all customers received the right to choose their suppliers freely at the first step. This complete and immediate liberalization distinguished Germany from the majority of European countries, which decided to open their markets gradually. Germany took another separate path by deciding not to set up a regulatory authority. The government relied on the market to regulate itself and restricted itself to *ex post* controls by reviewing allegations of abuse under anti-trust laws.

Associations of grid operators and grid users were to regulate grid access jointly and determine grid fees

[1] Under the single buyer system, the single buyer is responsible for centralized purchase and sale of electricity. If a customer in this system finds a supplier with a low price, the single buyer takes this electricity into its grid, and the customer receives the price advantage.

Figure 2

DEVELOPMENT OF EUROPEAN AND GERMAN REGULATION SINCE 1996



Source: RWE.

through association agreements based on the principle of negotiated grid access. In the first association agreement, the associations initially agreed upon transaction-based fees, which were to be charged separately for each transit. Since this concept became a real barrier to competition due to procedural complexities, a non-transaction and non-distance-related fee was introduced when the association agreement was amended in 1999. Negotiated grid access was significantly simplified by setting uniform grid fees per grid operator and voltage level. In addition, industry solutions were developed, e.g. for data management and for switching customers. However, they were only recommendations, and not all companies adopted them.

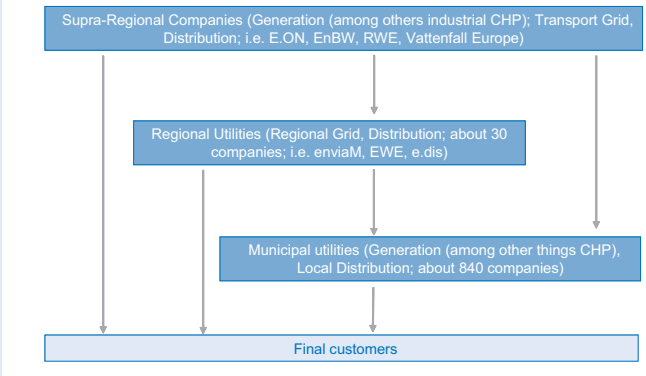
Even if network access was troublesome at the start of liberalization, industry and households nevertheless profited from significant decreases in prices attributable to the competition that sprung up between 1998 and 2000. The industry became more consolidated due to the cost pressure resulting from falling prices (Figure 3). The initial eight large inter-regional utilities merged into the four companies that exist today: EnBW AG, e.on Energie AG, RWE AG, and Vattenfall Europe AG. These companies account for about 80 percent of the electricity generated in Germany. Their subsidiaries operate the transmission network in the four German control zones. In addition, they hold equity interests in numerous of the over 50 regional utilities and approximately 840 local suppliers, which are mainly municipal utilities.

In the first phase of the liberalization, a large number of new, independent suppliers caused significant movement in the market. However, most of their business models turned out to be not economically viable over the long term. In addition, they felt noticeably constricted by established utilities. The charging of changeover fees or insistence on highly complex sets of contracts were cited as examples of this. Today only a small number of suppliers remains in the mass market. New players in the services and trading segments and alliances of regional or local utilities (e.g. Trianel) have been more successful in establishing themselves in the market.

An essential component of this success was the start of exchange trading in Germany in 2000: in two marketplaces initially (Leipzig and Frankfurt) and then only at the European Energy Exchange (EEX) in Leipzig after their merger in 2002. The EEX initially started with pure spot market trading, but now offers monthly, quarterly, and yearly futures on the forward market, too. 138 companies from 17 countries currently trade on the EEX (March 2006). In 2005 alone, the total trading volume rose by 52 percent to 602 terawatt hours (TWh). The quantity traded on

Figure 3

GERMAN MARKET STRUCTURE: THREE LEVELS



Source: RWE.

the spot market alone (86 TWh) corresponds to 17 percent of all electricity consumption in Germany. Thus, the EEX is currently the most liquid wholesale trading market in Europe, excluding mandatory exchanges, such as the Spanish OMEL.

The increase in government charges, a strong increase in the demand for electricity, and rising prices for primary sources of energy have resulted in a noticeable increase in end consumer prices in Germany since 2000. Even though these prices were still below the pre-liberalization level in 2005, the prices were seen to be a sign of inadequate competition in the electricity market as early as 2003.

To the extent electricity became a commodity listed on an exchange, the cost-plus principle, which had predominated in the wholesale market in the past, was replaced by a market price formed on the basis of supply and demand. The amount of this competitive price for electricity is currently based on the marginal costs of the most expensive power plant still necessary to meet demand. If the costs of the marginal power plant increase, the market price also increases. Significant factors influencing the supply-side are, for example, the availability of power plants and the (increasing) feed-in from wind power generators in the short term and changes in capacity or the composition of the power plants – which have more long-term effects. Weather, business conditions, and demographic changes may affect the demand side. The market price may also be affected by political factors, such as subsidies for renewable energies and combined heat and power generation and the introduction of trading in CO_2 emission certificates since 2005.

The highest possible availability of reliable information and, therewith, high market transparency are of great importance to the functioning of the wholesale market for electricity, which is influenced by so many factors. Market participants have responded to calls for regulation of the information that should be published with voluntary initiatives, e.g., with respect to available transmission capacity or generation. For example, since early April, the four large German power plant operators have provided information on installed and available capacity and generated energy to all interested parties on the EEX Internet platform each trading day. This is to increase confidence in pricing on the EEX and further promote competition.

The second phase – start of regulation

Along with the reluctance of member states to open their markets rapidly and complaints all over Europe about difficulties in gaining market access, this development gave the Commission reason to provide a stimulus for accelerating the liberalization process by presenting proposals for a new directive.

In 2003, the European Council and the European Parliament agreed on an acceleration package (Figure 2). The new regulation obliged member states to open the electricity market for all commercial customers by 2004. From 2007, all household customers in the EU were to be able to freely choose their suppliers. In addition, vertically integrated companies were required to unbundle and create a separate legal entity for the grid (with the possible exception of companies with < 100,000 customers). Finally, member states were required to set up national regulatory authorities.

These changes necessitated extensive amendments to the German Energy Industry Act. This change in paradigm from association agreements to a regulated system contributed to Germany's inability – and that of many other member states – to meet the 1 July 2004 deadline for implementing the Directive into national law. The new Energy Industry Act finally took effect on 13 July 2005, more than a year late.

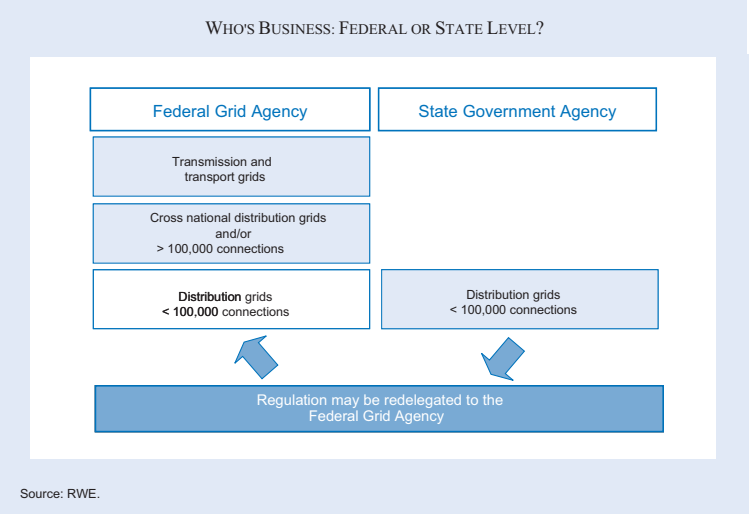
Figure 4

KEY ELEMENTS OF THE NEW GERMAN ENERGY INDUSTRY ACT (EnWG)

- New Act on the regulation of the German electricity and gas markets (Energiewirtschaftsgesetz – EnWG) enforced on 13 July 2005
- New regulatory authority "Bundesnetzagentur"(BNA, Federal Grid Agency, formerly known as regulatory agency for post and telecommunications) to monitor grid access as well as electricity and gas grid fees
- Grid operators with fewer than 100,000 electricity or gas customers can be regulated by one of the 16 federal states. The federal states may delegate responsibility to the BNA.
- Ex-ante approval of all grid fees
- Method of calculating grid fees
  - Present "current cost accounting" to be maintained for existing assets; real rate of interest on equity (equity-financed regulated asset base) 6.5%
  - As of 2006, regulation based on historic cost accounting with inflation-adjusted returns for new assets; nominal interest rate on equity 7.91 %
- Proposal of a system of incentive regulation until July 2006 by BNA to replace the current "cost plus" calculation. Incentive regulation, on the basis of a legal regulation, is expected to become effective in 2008.
- The tariff-rate approval by the federal states for electricity tariffs of residential customers will be abolished two years after the formal start of regulation.

Source: RWE.

Figure 5



Source: RWE.

Grid access rules remained basically unchanged with the exception of the rules for the balancing power market. The most important new rules for the electricity sector (Figure 4) were as follows.

A regulatory agency was set up to supervise grid access and monitor grid fees (Figure 5). Regulatory tasks were delegated to the Federal Grid Agency for Electricity, Gas, Mail, Telecommunications, and Railroads (the Federal Grid Agency for short, BNetzA). State regulatory agencies are responsible for companies with fewer than 100,000 customers connected to their distribution grids if their distribution grids are situated within that German state. The German states can re-delegate these tasks to the Federal Grid Agency. All the German city-states as well as the States of Thuringia, Lower Saxony, Schleswig-Holstein and Mecklenburg-Vorpommern have made use of this option.

In the future, all grid fees must be approved *ex ante* by the competent regulatory agency. The rules for calculating such fees are set forth in detail in the Energy Industry Act and in a supplemental Network Fee Regulation. For new assets, the return on equity was set at 7.91 percent. For old assets it is 6.5 percent (before taxes in each case). The equity ratio was limited to 40 percent.

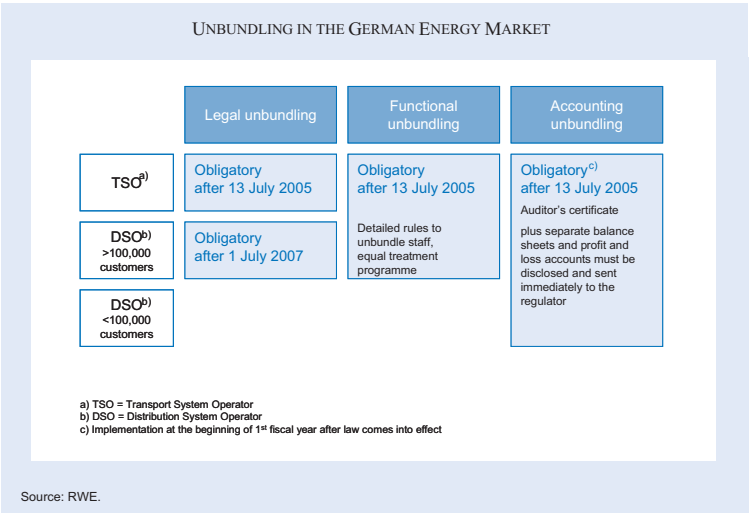
Beyond mere cost control, an incentive regulation system is to be established no later than 2007. The Federal Grid Agency is to work out a concept for this system by July 2006 with the participation of the German states and the affected industrial associations and scientists. The system will be finally established by a regulation issued by the German Federal Government with the approval of the Bundesrat.

Vertically integrated companies will be required to unbundle their networks legally, functionally and in accounting terms, from the generation, sales and trading segments (Figure 6). While transmission network operators must unbundle as soon as the new Energy Industry Act takes effect, the legal unbundling of distribution grid operators can be postponed until 1 July 2007. Distribution grid operators with fewer than 100,000 customers, which are not part of a corporate group, are excepted from the requirement of legal unbundling.

Sales companies must inform their customers of the composition of the electricity they deliver and its environmental effects. In so doing, distinctions must be made between the categories of nuclear energy, fossil fuels and other fuels. In addition, the grid fee must be shown separately on customer invoices.

Finally, it was decided that – consistent with regulation of the grid segment – *ex ante* review of general tariffs for small customers should expire when the Federal Tariff Regulation for Electricity expires in

Figure 6



Source: RWE.

July 2007. Thus, there would be a transition from the cost-plus principle to competitive prices for this group of customers, too. Due to increasing freedom in setting prices, new market participants, in particular, would be given incentives to enter the market in form of margins that are likely to be adequate. For this reason, it was anticipated that competition would be stimulated in the household customer market.

Therefore, the Federal Grid Agency concentrates on the grid segment. The agency is responsible for rule-making, e.g. for the incentive regulation and the balancing power market, and for grid access and customer switching procedures. Its oversight responsibility extends, for example, to compliance with unbundling requirements and non-discrimination provisions, in addition to approval of grid fees. The Federal Grid Agency is also the place for grid users to file complaints.

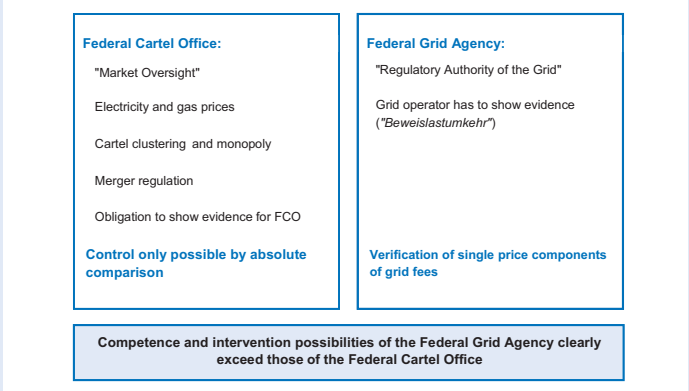
The Federal Grid Agency has no influence on price formation in the wholesale and retail markets. It is the task of the Federal Cartel Office to monitor this as part of its policing of abuse under anti-trust laws (Figure 7). In the special case of trading at power exchanges, stock exchange oversight authorities, such as the Stock Exchange Council [Börsenrat] or the Trade Monitoring Office [Handelsüberwachungsstelle] are responsible for preventing market manipulation. Allegations that the "Big Four" abused their market power were again not proven in the sector inquiry by the EU Commission. The commission found no evidence of this in light of their actual market shares of the wholesale trade and the large number of marginal power plants involved in price-setting. This is all the more so, since the influence of wind-generated electricity and interconnection capacity on the competitive situation was not taken into account.

The Federal Grid Agency has already dealt with a massive quota of work since its inception in the summer of 2005. In addition to harmonizing customer switching procedures and data formats, and questions about balancing group accounting and obtaining minute reserves, comprehensive data on grid operators has been gathered. Thus, power grid operators had to provide the Federal Grid Agency with almost 700 individual pieces of data on their companies by 1 November 2005 as a basis for the comparison market and the incentive regulation. For many companies compliance was difficult since these data could often not be gathered or could not be gathered as within the stated stipulations.

However, the Federal Grid Agency has focused its efforts on reviewing applications for approval of grid fees. Electricity grid operators had to submit their applications to the competent regulatory authorities by the end of October 2005. The review period is six months from the time all documents are submitted. In addition, there were conceptual activities in developing the incentive regulation.

Figure 7

FEDERAL GRID AGENCY – FEDERAL CARTEL OFFICE:
COMPETENCIES AND INTERVENTION POSSIBILITIES



Source: RWE.

Current and future challenges: Design of incentive regulation

It appears that politicians and the public will measure the success of the regulatory authorities solely by how quickly grid fees drop. Lower grid fees should make it easier for competitors to enter the market and facilitate liberalization. However, the aim is to find a reasonable balance between an adequate return on invested capital, so grid operators can maintain their ability to invest, and the interest of grid users in the lowest possible prices.

One problem with traditional cost-plus regulation, which is currently the basis for grid fee approval proceedings, is a tendency for regulated companies to over-invest. This occurs when the grid operator's costs of capital are lower than the return it is granted. Added to this are possi-

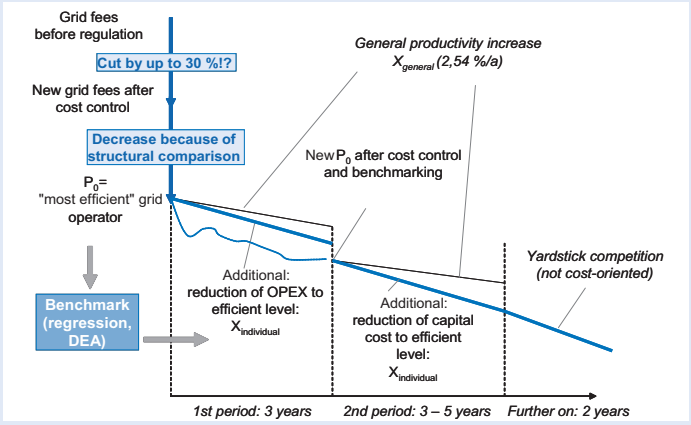
ble inefficiencies in operations: When regulation is cost-based, the grid operator has no incentive to lower its costs, since they are reimbursed on a 1:1 basis. Any reduction in costs would directly result in a reduction in revenues.

Thus, the focus of the current review of approval applications is on whether the grid costs listed by grid operators are really grid costs and if their scope is justified. Despite extensive data collection by the Federal Grid Agency, the problem remains that, in doubtful cases, grid operators always have better knowledge of their cost situations than the regulatory authorities. Therefore, grid operators will try to use this superior knowledge to their advantage in the cost reviews. Therefore, the Federal Grid Agency tends to mistrust all attempts by grid operators to maintain the current level of costs. It is anticipated that the Federal Grid Agency may use the extensive discretion granted to it by the Grid Fee Regulations to lower fees markedly. In light of the interpretation of the calculation method announced by the Federal Grid Agency, litigation is beginning to emerge over the correct interpretation of the regulations. Thus, instead of imputed trade taxes, only the portion of actually paid trade taxes, attributable to network operation, should be recognized. This would annul the combination of public services in many municipal utilities for tax purposes and run counter to the concept of unbundling. In addition, the Federal Grid Agency is attempting to limit the equity needed for operations and thereby the returns on invested capital to such an extent that the grid operator's ability to make investments may be significantly restricted.

These problems should be overcome – at least in part – with introduction of the Incentive Regulation in 2008. However, the basic goal of this mechanism is to influence the behaviour of grid operators so they develop a self-interest in making grid operation more efficient within the framework of maximizing their operating profits. Thus, both customers and grid operators should profit from the advantages of increased efficiency. Additionally, grid operators should be enforced to invest in the grid not being negatively affected by the incentive regulation. Thus, the Federal Grid Agency must act with high sensitivity not trying to push through marked grid reductions at any costs.

Figure 8

INCENTIVE REGULATION: DRAFTED CONCEPT OF THE FEDERAL GRID AGENCY



Source: RWE.

In its first draft for the report, to be compiled by July 2006, the Federal Grid Agency already presents detailed proposals (Figure 8). Here, too, there is a cost control at the start of the first two regulatory periods – which will last between three and five years. To this end, a development path for revenues is to be established for each regulatory period, based on the initial cost basis. This determines the extent to which the grid operator must change its revenues within the regulatory period. Apart from inflation, the basis for determining efficiency requirements is firstly, the anticipated development of general productivity of grid operators and secondly, efficiency objectives that are specific to the company. The latter are determined by benchmarking the grid operator using a combination of various methods to ensure robustness. Deficits in efficiency that would not be found by cost control are to be detected through "as if" competition, taking structural differences thoroughly into account. In so doing, it must be kept in mind that the grid operator with the lowest fees is not necessarily the most efficient. More inefficient grid operators will be given higher objectives than efficient ones.

Increases in efficiency and cost reductions below the established level are credited to grid operators in the form of additional profits that may be retained. These additional increases in efficiency are not passed on to grid users until the start of the next regulatory period, as part of cost controls.

If the grid operator does not meet efficiency requirements through lack of effort or if the regulatory au-

thority sets the requirements too high, there is a risk the grid operator may suffer a loss. Therefore, one of the core requests of the energy industry associations (VDEW, VDN) is that the efficiency requirements be not only attainable but also surpassable. A grid operator of average efficiency must be able to obtain average, market-based profits. If the Federal Grid Agency proposes to introduce efficiency requirements that are based on the most efficient grid operator, this will overstrain most of the grid operators reducing their profits far in excess of the objectives of grid regulation. On the contrary ensuring the achievability of efficiency requirements has to be one of the basic principles of incentive regulation.

There are differences of opinion, particularly with respect to what amount of progress in increasing productivity and efficiency is possible and reasonable for an individual grid operator within a regulatory period. The regulatory authority must not quantify potential reductions of individual cost items, but must rather determine the overall potential for increased productivity on the basis of only those costs that are subject to influence. Completely eliminating all the inefficiencies identified in the benchmarking process within one period could overtax a company, as shown by experience, e.g. Great Britain. In the final analysis, the grid operators themselves are responsible for selecting the measures to be taken. However, additional standards on the quality of supply (interruptions of supply, quality of service, quality of the voltage) should prevent cost-cutting measures from being taken solely at the expense of the quality of supply. Whereas reductions in grid fees are apparent immediately, omitted investments become apparent gradually in the medium and long term only. Therefore, there is no clear accountability.

With respect to the demands for noticeably lower grid fees often raised by politicians and the public, it must be recognized that many costs cannot be influenced by the grid operator – at least in the short term. This applies, for example, to the costs of grids with higher voltage levels that can only be passed on, to system services and to additional costs occasioned by the Renewable Energies Act or the Combined Heat and Power Generation Act. Moreover, grids cannot be modified at will within a short period of time. They have developed over time and can be adapted to changes in generation and consumption structures only within the framework of long-term investment cycles. The efficiency potential of optimizing fixed assets that can only be optimized over the long term must be much larger than optimizing the particular fixed assets. Since investments cause short-term costs of capital and generate revenues only in the long run, incentive regulation at first hampers investments. Moreover, personnel costs cannot be reduced at will, due to collective wage agreements and employment laws. All these considerations must be taken into account in setting efficiency requirements. Therefore, there can be no rapid downward price spiral to the level of the most economical grid operators if these differing considerations are taken into account.

The Federal Grid Agency will present its final proposal for an incentive regulation in July. Politicians and regulatory authorities will then face the task of moulding it into a regulation. On the one hand, the incentive concept must be simple and transparent for the public. On the other hand, complex operational and economic interrelations must be reasonably reflected. All participants must resist attempts to simply push through grid fee reductions – which are unreasonable from an operational standpoint – for purely political reasons. Otherwise, restrictions on the grid operator's ability to make investments can endanger the currently recognized high quality of supply.

At present, it is unclear how the division of responsibilities between the Federal Grid Agency and the state regulatory authorities will work out. A committee involving representatives from the Federal Grid Agency as well as from the States should ensure close coordination and a uniform interpretation of discretionary leeway. It is still too early to assess the extent to which this will succeed.

Questions of grid access have lesser weight as compared to other industries. The electrical grid is, of course, a natural monopoly, and rules must be established for its use. However, it is not in exclusive use, as are railroads and gas networks. Of particular importance are the rules associated with first-time use of third-party grids, e.g. in the context of a customer switching or connection of a power plant to a grid. For example, a sales company must not gain access to grid data through common use of IT systems. Grid users must be treated equally in billing procedures. A transparent and non-discriminatory procedure must be implemented for processing grid connection applications from power plants, particularly if available grid capacity is not adequate for the connection capacity being requested in a territory.

Prices in the wholesale markets have led many investors to initiate new power plant projects and expand generation capacity. The large number of investment projects being announced attests to this. This also proves that, if there is competition in the wholesale markets, the markets will provide sufficient incentives for investment in security of supply. The member states of the European Union rightly refrained from including command measures in the acceleration package and in the discussions of the Directive on the Security of Electricity Supply and Infrastructure Investments.

Applications to connect power plants to the grid, which are currently piling up particularly in North Rhine-Westphalia, provide new challenges to transmission grid operators. Not only must they integrate these power plants into the grid, they must also cope with the expansion of wind energy and increasing demands made on the efficiency of the transmission grids by the growing international trade in electricity. The increasing feed-in of wind energy – which is concentrated in North Germany far from the main consumer centres – into the grid and the trade in electricity therefore require, according to the conclusions of the 2005 Dena Study on the Integration of Wind Energy, the construction of at least 855 km of new high voltage lines, particularly in a north-south direction, by 2015. This is aggravated by the planned shutdown of nuclear power plants, primarily in southern Germany, where no adequate replacement investments are foreseeable. This not only stresses the ability of transmission operators to invest. In view of the long planning and approval process, however, these changed requirements appear difficult to meet.

Pricing and Reimbursement of Prescription Drugs in German Social Health Insurance*

Stefan Greß
Jürgen Wasem and
Dea Niebuhr**

Introduction

The current regulation of the market for prescription drugs in German health insurance is under pressure for two reasons. First, third-party payers are unable to control expenditures effectively. Expenditures for prescription drugs are continuously increasing and at a more rapid pace than expenditures in other health care sectors such as ambulatory care and hospital care. Second, third-party payers are incapable of setting incentives for individual physicians to prescribe more efficiently. Physicians prescribe a considerable share of prescription drugs that are more expensive than therapeutic or generic substitutes (Schwabe and Paffrath 2005).

In this paper we develop and present reform scenarios for the regulation of prescription drugs in German health insurance by comparing two important parameters for third-party payers and manufacturers across health care systems. These parameters are regulation of reimbursement and regulation of pricing. Reimbursement and pricing of prescription drugs are regulated extensively in a variety of health care systems. It is obvious that markets for prescription drugs are regulated in health care systems that are predominantly financed by public funds – tax money or social security contributions. However, there is also regulation of prescription drugs in health care systems that are predominantly financed privately – such as the private health insurance sector in the US health care system. The difference is in the level of regulation. As a rule, we find centralized regulation in public systems – either by government itself, agencies authorized by government or by some kind of corporatist intermediaries authorized by law. Centralized regulation implies that the outcome of this regulation – such as reimbursement decisions and prices for prescription drugs – is the same for all third-party payers. In contrast, decentralized regulation prevails in private systems. In the private health insurance sector of the US health care system, individual health plans, pharmaceutical benefits managers or other intermediaries negotiate with manufacturers directly in order to determine reimbursement decisions and individual prices of prescription drugs. As a consequence, the outcome of decentralized regulation may vary between third-party payers.

In this article we compare different levels of regulation across different types of health care systems which determine reimbursement decisions and pricing decisions. Reimbursement decisions determine whether a specific prescription drug will be reimbursed by third-party-payers. Pricing decisions determine the price third-party-payers have to pay for this specific prescription drug. Our comparison includes a variety of different health care systems – one-payer public systems such as the UK, multiple-payer public systems such as Switzerland and multiple-payer private systems such as the private health insurance sector in the US. However, as already indicated by the title of our article, the spotlight of our attention is on reimbursement and pricing decisions in German social health insurance.

The article is organized as follows. In section 2 we analyze reimbursement regulation – both on a centralized and on a decentralized level. In order to illustrate reimbursement regulation on a centralized level we discuss short case studies on Germany, Switzerland and the UK. In order to illustrate reimbursement decisions on a decentralized level we discuss case studies on the private health insurance market in the US and – although only partly applicable – on the social health insurance market in Israel. In section 3 we analyze pricing regulation – again both on a centralized and on a decentralized level. We use the same short case studies to illustrate our findings. Finally, in section 4 we discuss reform scenarios for the regulation of reimbursement and of

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pricing prescription drugs in German social health insurance. We conclude that decentralized pricing and centralized reimbursement is a viable compromise between consumer protection and a more competitive and cost-effective market for prescription drugs in German social health insurance – and other similar markets for prescription drugs.

Regulation of reimbursement

Reimbursement of prescription drugs in any third-party-payer system is not equivalent to market approval by regulatory agencies such as the Food and Drug Administration (FDA) in the US. In any third-party-payer system a variety of instruments to determine the reimbursement status of prescription drugs is being used (Greß et al. 2005b). We distinguish between instruments that are used on a centralized level and instruments that are used on a decentralized level.

Centralized regulation

The results of our review of instruments used to determine the reimbursement status of prescription drugs on a centralized level are displayed in Table 1. Most European countries indeed use centralized regulation in addition to market approval. The effectiveness of new prescription drugs is assessed by a centralized institution. Moreover, theses institutions are also increasingly required to assess the cost-effectiveness of new prescription drugs. However, the assessment of cost-effectiveness very rarely leads to the exclusion of prescription drugs from reimbursement. The outcome of (cost-) effectiveness assessments result in country-specific formularies which sometimes are augmented by lists of prescription drugs to be excluded form reimbursement.

Although these results point toward common trends in centralized regulation, details of regulation differ considerably between countries. This finding can be illustrated by short case studies of centralized regulation in Germany, Switzerland and the UK (Greß et al. 2005a).

In German social health insurance, reimbursement decisions are made on a central level by a corporatist body – the Federal Joint Committee. The Federal Joint Committee consists of representatives of sickness funds, health care providers and patient organizations. Representatives of patient organizations are allowed to attend. However, they are not allowed to vote. It was only in 2004 that the legislator allowed this corporatist body to exclude prescriptions drugs from reimbursement. These decisions need to be based on a (negative) clinical effectiveness assessment of the prescription drug concerned. Reimbursement of all other prescription drugs with market approval is mandatory for all social health insurers in Germany. In contrast to most other countries, there is no country-specific formulary in Germany. The new German Institute for Quality and Efficiency in Health Care is responsible of conducting health technology assessments and for giving recommendations to the Joint Committee. However, German legislation rules out the use of cost-effectiveness assessments as a criterion for determining the reimbursement status of prescription drugs.

In Switzerland, the reimbursement status of prescription drugs is also determined on a centralized level. Formally, the Swiss Federal Office of Public Health is in charge of all reimbursement decisions. The Federal Office has established the Federal Drug Commission to give recommendations for reimbursement decisions. The Federal Drug Commission

Table 1

Instruments for centralized regulation in EU-15 and EFTA countries: Reimbursement

Countries	Assessment of effective–ness	Assessment of cost-effective-ness	Country-specific formulary
Austria	X	++	X
Belgium	X	++	X
Denmark	X	++	X
Finland	X	++	X
France	X	++	X
Germany	X	–	–
Greece	X	+	X
Ireland	X	++	X
Italy	X	++	X
Netherlands	X	++	X
Norway	X	++	X
Portugal	X	++	X
Spain	X	+	X
Sweden	X	++	X
Switzerland	X	+	X
UK	X	+++	X

Luxembourg, Liechtenstein and Iceland not included.
X Implemented.
– Not implemented.
+ Emerging assessment of cost-effectiveness.
++ Assessment of cost-effectiveness is obligatory but not a criterion for exclusion.
+++ Strong assessment of cost-effectiveness is also used as a criterion for exclusion.

Sources: Dickson et al. 2003; Greß et al. 2005b; Stafinski and Menon 2003.

consists of physicians, pharmacists, academics, representatives of health insurers, of patient organizations and of manufacturers. In contrast to Germany, health insurers may reimburse only those prescription drugs that are listed on the country-specific formulary. The Federal Drug Commission lists new prescription drugs if the assessment of clinical effectiveness has been positive. Moreover, the assessment results in a classification of new prescription drugs based on their degree of innovation. Although legislation requires assessments to be based also on cost-effectiveness of new prescription drugs, assessment of cost-effectiveness so far is not a criterion for exclusion from reimbursement in Switzerland (Cranovsky et al. 2000).

Similar to Germany and Switzerland, in England and Wales the reimbursement status of prescription drugs is determined on a centralized level by the National Institute of Clinical Excellence (NICE). Decisions are made by the Appraisal Committee which consists of health care providers, representatives of manufacturers, patient organisations, representatives of regional health authorities und health economists. In contrast to Switzerland, NICE does not list all prescription drugs that are eligible for reimbursement. Regional health authorities are required to reimburse drugs which are recommended by NICE and may also reimburse all other drugs that are not excluded by NICE. Only very rarely does NICE exclude prescription drugs form reimbursement completely. However, it is quite common that NICE limits the use of drugs to certain indications and populations subgroups. The use of cost-effectiveness as a decision criterion for reimbursement is quite advanced in England and Wales (Devlin and Parkin 2004).

Decentralized Regulation

Reimbursement decisions usually are made on a centralized level. In countries with one-payer health care systems such as England or France there is no alternative to this approach. Diverging reimbursement decisions for the same payer – e.g. in different regions – are difficult to imagine. However, there is an alternative to centralized regulation in multi-payer systems such as Switzerland or Germany. If there are multiple third-party payers – and enrollees of these payers may switch to other payers on a regular basis – it is quite conceivable that reimbursement decisions are made on a decentralized level. As a consequence, individual payers make individual reimbursement decisions. This practice is rather common in the US private health insurance market and – at least to some extent – in the social health insurance market in Israel.

In fact reimbursement decisions in Israel are made on a centralized level as well as on a decentralized level. However, there is some latitude for individual health insurers. This flexibility is limited to prescription drugs that can be substituted generically or therapeutically. As a consequence, health insurers in Israel have individual formularies for these products. However, stand-alone patents need to be reimbursed by all health insurers (Sax 2001).

In contrast to the social health insurance market in Israel, there is no centralized regulation at all for reimbursement decisions on the private health insurance market in the US. However, this does not mean that market approval of prescription drugs by the FDA is equivalent to reimbursement by private health insurers. It does mean that health insurers are free to determine insurer-specific formularies. In doing so, health insurers are not restricted by centralized institutions. As a consequence of the managed care revolution in the 1980s and 1990s, most health insurers in the US have developed insurer-specific formularies (Frank 2001). The design of insurer-specific formularies varies considerably. Three types of insurer-specific formularies – the main instruments of decentralized reimbursement regulation – can be distinguished (Huskamp et al. 2003):

1. *Open* Formularies. Open Formularies contain prescription drugs which are preferred by the health insurer. However, physicians may also prescribe other products which the health insurer will also reimburse.
2. *Closed* Formularies. Closed Formularies contain all prescription drugs which are reimbursed by the health insurer. If physicians prescribe other products the health insurers will not reimburse them.
3. *Incentive* Formularies. Incentive Formularies are closed formularies that allow physicians and patients more choice for generic and therapeutic substitutes. Co-payments for patients are higher for branded generics and me-too patents.

Private health insurers have become reluctant to use closed formularies since they are unpopular with consumers. Now they mostly use a mix of open and closed formularies. Moreover, incentive formularies

have become more pervasive recently (Peters et al. 2001). It is not transparent which criteria private health insurers in the US use for designing insurer specific formularies. Variations in the use of cost-effectiveness assessments are high although a non-binding standard for the development of evidence-based formularies was established in the year 2000 (Garbner 2004; Neumann 2004).

For the new Medicare drug coverage starting in 2006 – which can also be provided by private health insurers – legislation explicitly allows closed formularies for generic and therapeutic substitutes (Atlas 2004). As a consequence, regulation in this part of the US health care system is now quite similar to regulation in Israel.

Regulation of pricing

We have shown that third-party-payers in any kind of health care system use a variety of instruments to regulate reimbursements of prescription drugs. In this section we analyze the instruments third-party-payers use to regulate the pricing of reimbursable prescription drugs. Again we distinguish between instruments that are applied on a centralized level and instruments that are applied on a decentralized level.

Centralized regulation

Table 2 illustrates the fact that there is a variety of instruments being used in order to regulate pricing of prescription drugs on a centralized level. Many countries use direct price regulation. Direct price regulation means that manufacturers are not free to determine prices freely. Either third-party-payers determine prices by themselves or third-party-payers negotiate with manufacturers about prices. In most countries prices are determined by the use of external reference prices of the product. Some countries such as France and Switzerland allow surcharges on the price if – as a result of (cost-) effectiveness assessments – the product is known to be very innovative.

Other countries – such as Germany and the Netherlands – use a more indirect and less restrictive approach to regulate prices. In principle, manufacturers are free to set prices for all products that are reimbursable. However, in these countries therapeutic and generic substitutes are clustered into groups on a centralized level. For each of these groups a reference price is determined. Generic and therapeutic reference prices need to be distinguished. Generic substitutes are pharmaceuticals with the same active ingredients and formulation. Therapeutic substitutes are pharmaceuticals with different active ingredients and formulations but with comparable therapeutic effects for the same indication (Danzon et al. 2005).

Third-party payers will reimburse only the reference price. If physicians prescribe products with a price above the reference price, patients need to pay the surcharge out-of-pocket. Manufacturers have a strong incentive for charging prices that are equivalent to the reference price. If the price were below the reference price, only third-party-payers and – if user charges are proportional to price – patients would profit from lower prices. On the other hand, patients are very sensitive to surcharges for products with a price above the reference price (Pavcnik 2002; Schneeweiss et al. 2002a).

Traditionally, manufacturers in Germany were free to set prices for reimbursable prescription drugs.

Table 2

Instruments for centralized regulation in EU–15/EFTA countries: Pricing

Countries	Direct price regulation	Internal reference prices	Free pricing	Control of profits	External reference prices
Austria	X	–	X	–	X
Belgium	X	X	–	–	X
Denmark	–	X	X	–	X
Finland	X	–	–	–	X
France	X	X	–	–	X
Germany	–	X	X	–	–
Greece	X	–	–	–	X
Ireland	X	–	–	–	X
Italy	X	X	–	–	X
Netherlands	–	X	X	–	X
Norway	X	–	–	–	X
Portugal	X	X	–	–	X
Spain	X	X	–	–	X
Sweden	X	X	–	–	X
Switzerland	X	–	–	–	X
UK	X (Generics)	–	X (Patents)	X (Patents)	–

Luxembourg, Liechtenstein and Iceland not included.
X Implemented.
– Not implemented.

Source: Greß et al. 2005b.

However, free pricing was restrained by the internal reference price system that was adopted in 1989. Although there have been several short periods of direct price controls of the German government to cut overall prices, free pricing is unrestricted for stand-alone patents. Reference prices are applicable for generic as well as for therapeutic substitutes in Germany. While generic substitutes are adequately covered by the reference price system, this is not true for therapeutic substitutes. Only since the 2004 health care reform, has the legislator again allowed the Joint Federal Committee to establish groups of therapeutic substitutes – including me-too patents. This provision was suspended from 1996 to 2003.

In contrast to Germany, there is no free pricing for prescription drugs in Switzerland. The Swiss Federal Office of Public Health and manufacturers negotiate prices for new prescription drugs. Negotiations start if (cost-) effectiveness assessment of the new product (see section 2) has been positive. Prices are based on external ex-factory reference prices in Denmark, Germany, the Netherlands and the UK. If the new prescription drug is shown to be very innovative, the Federal Office adds a surcharge to the external reference price – up to 20 percent for a maximum of 15 years. If manufactures are not willing to supply their products with the price suggested by the Federal Office, the product will not be listed on the country-specific formulary.

Although manufacturers are free to set prices for patented prescription drugs in the UK, they face a unique method of indirect price regulation. The Pharmaceutical Price Regulation Scheme (PPRS) stipulates that manufacturers have to lower prices if their profits exceed a threshold. If manufacturers fall below these thresholds they may raise prices of their products. At the moment the thresholds are 21 percent for return on capital and six percent for return on sales. However, the margin of tolerance is quite substantial – between 40 percent and 140 percent. As a consequence, manufacturers need to lower prices if their return on capital exceeds 29.4 percent and if return on sales exceeds 8.4 percent. They may raise prices if return on capital falls below 8.4 percent and if return on sales falls below 2.4 percent (Association of the British Pharmaceutical Industry and Department of Health 2005).

Decentralized regulation

Although centralized regulation of pricing is as pervasive as centralized regulation of reimbursement, there is also a variety of instruments to regulate pricing of prescription drugs on a decentralized level. As a consequence, the price of the same prescription drug may vary considerably between third-party-payers, although it would be the same for all third-party-payers if it were regulated on a centralized level. In Israel price competition is limited to generic and therapeutic substitutes (see section 2). The market for social health insurers is highly concentrated in Israel. There are only four competing social health insurers in Israel. The biggest – Clalit – has a market share of about 60 percent. As a consequence, price competition for substitutes is high and third-party-payers are quite successful in negotiating rebates with manufacturers (Sax 2001).

Decentralized regulation of pricing also leads to price competition for prescription drugs on the private health insurance market in the US. Multiple third-party payers are free to negotiate prices with manufacturers of prescription drugs. If third-party payers are not satisfied with the results of these negotiations they are also free not to list these products on their insurer-specific formularies. On the other hand manufacturers can also decide not to supply their products if they are not satisfied with the price offered by a third party. In contrast to health care systems with centralized pricing regulation, manufacturers may find other third-party payers who are willing to pay a higher price.

Decentralized regulation of pricing on the private health insurance market in the US is not equivalent to negotiations between individual third-party payers and individual manufacturers. Although this setting might occur, mostly third-party payers have outsourced the negotiating process to PBMs – pharmaceutical benefit managers (Goff 2002). PBMs perform a variety of tasks for third-party payers in the US. Most importantly, PBMs assist in the design of insurers-specific formularies, negotiate discounts and rebates with manufacturers of prescription drugs and organize retail services for enrollees (GAO 2003).

Actually third-party payers and PBMs negotiate discounts, not prices, with manufacturers. The size of discounts usually depends on the prescription volume of the product. The more physicians prescribe the product – and the more patients consume it – the higher are the discounts. As a consequence, PBMs negotiate discounts form manufacturers in return for a preferred status on the insurer-specific formulary

and an increase in market share (Danzon et al. 2005).

Information about the size of discounts is difficult to obtain. However, it is estimated that PBMs can negotiate rebates of up to 35 percent of the standard prize for patents (US DHHS 2002). PBMs keep 10 to 30 percent of the savings for themselves (Pennsylvania Health Care Cost Containment Council 2004). Rebates are tied closely to insurer-specific formularies and to contractual relations with physicians. Third-party payers and PBMs set incentives for physicians as well as for enrolees to increase the use of preferred prescription drugs. Physicians are either obliged to prescribe them if they are employed by a third-party payer. The prescription of preferred drugs can also be part of the contract between third-party payers and physicians. Moreover, patients often pay lower user charges for preferred prescription drugs if third-party payers use incentive formularies.

As a consequence, price competition is highest for generic substitutes and lowest for stand-alone patents. Concentration of the US pharmaceutical industry has increased since the beginning of the managed care revolution. Manufacturers try to counteract the strong position of third-party payers and PBMs. Moreover, manufacturers of prescription drugs were able to recover some of their revenues losses due to discounts to PBMs by raising the standard prize of their products. Thus, uninsured individuals and non-negotiating third-payers have to pay an even higher price for prescription drugs (Frank 2001).

Table 3

Levels of regulation: Reimbursement and pricing

		Reimbursement	
		Centralized	Decentralized
Pricing	Centralized	Social health insurance in Germany *Scenario #1*	–
	Decentralized	Social health insurance in Israel Medicare (2006) *Scenario #2*	Private health insurance in US *Scenario #3*

Source: Greß et al. 2005b.

Future regulation of prescription drugs in German social health insurance

Sections 2 and 3 have shown that several features of pricing and reimbursement of prescription drugs in German social health insurance are peculiar. First, only in German social health insurance is market approval of new products almost equivalent to reimbursement by third-party payers. Second, only in 2004 did legislation make it possible to exclude prescription drugs from reimbursement with a negative effectiveness assessment. Third, in contrast to other health care systems, the legislator has not introduced the use of cost-effectiveness assessments for reimbursement decisions. Fourth, manufacturers of prescription drugs are free to set prices for their products – although free pricing has been restricted by internal reference pricing for generic substitutes since 1989 and for therapeutic substitutes since 2004.

Since expenditures for prescription drugs in German social health insurance are constantly increasing, we assume that the legislator will continue to adjust the regulation of reimbursement and the pricing of prescription drugs. Table 3 points out three reform scenarios that are based on our analysis in sections 2 and 3. In scenario #1, the legislator will improve the existing system of centralized reimbursement and centralized pricing. In scenario #2 reimbursement decisions will remain on a centralized level while pricing decisions will be decentralized – similar to the system of social health insurance in Israel or Medicare 2006 in the USA. If the legislator adopts scenario #3, both reimbursement and pricing decisions will be decentralized – similar to the private health insurance system in the US. Below we discuss the consequences for patients, manufacturers and third-party payers for each of the three reform scenarios.

Scenario #1: Centralized reimbursement and centralized pricing

This reform approach assumes that the legislator will follow a path-dependent approach. Two main features of regulation reimbursement and pricing will remain unchanged. First, regulation will continue to be centralized. Second, pricing regulation will continue to be indirect rather than direct. As a consequence, the legislator will primarily improve the effectiveness of internal reference prices. Moreover, the legislator will introduce the use of cost-effectiveness assessments

for reimbursement decisions. In fact the obligatory use of cost-effectiveness assessments for reimbursement decisions was included in an early draft of the 2004 health care reform – but did not make it into the final draft of the reform law.

If reimbursement decisions in German social health insurance are made on the basis of cost-effectiveness assessments, two approaches for implementation will be feasible. First, only prescription drugs with a positive assessment will be listed on a country-specific formulary. Other prescription drugs will be excluded from reimbursement. Second, only prescription drugs with a positive assessment will be excluded from reference pricing. All other drugs will be subject to therapeutic reference pricing. As a consequence, prescription drugs with a negative cost-effectiveness ratio will continue to be reimbursed – albeit only on the level of the reference price. Given the German proclivity toward reference pricing, we consider the latter approach to be more feasible. As a consequence, there will be free pricing for stand-alone patents and internal reference pricing for generic and therapeutic substitutes.

What will be the consequence of this approach? Patients will be eligible to full reimbursement for stand-alone patents and for reimbursement of the reference price of products that are generically or therapeutically equivalent. If groups are homogenous, effects on patients are negligible (Schneeweiss et al. 2002b). However, therapeutic referencing is more controversial than generic referencing. It treats prescription drugs with different ingredients as perfect substitutes although effectiveness and/or side-effects might be different for at least some patients (Danzon et al. 2005). If groups are heterogeneous with respects to effectiveness and/or side effects and manufacturers are unwilling to lower their price to the reference price, some patients will face increased co-payments. Even worse, manufacturers might take their products from the market entirely.

Consequences for manufacturers in this setting also depend very much on the ability to establish homogenous therapeutic reference groups on a centralized level. If groups are homogenous, manufacturers face increased incentives to invest in innovative products rather than in me-too products. However, if groups are heterogeneous, manufacturers face disincentives to invest in innovations at all since they might not be able to recover their costs for research and development from the lower reference price.

Effects on third-party payers are unclear. Third-party payers are less interested in prices of prescription drugs than in expenditures for prescription drugs. Expenditures are determined by price, volume and the composition of prescriptions. Prices for stand-alone patents in our setting probably will increase while prices for me-too patents will decrease. Prices for generics will not change very much. If prescription behavior does not change, expenditures decline. However, if physicians switch to prescribing stand-alone patents rather than me-too patents or generics, expenditures will not go down. Third-party payers have no influence on the outcome either way since they are unable to set incentives for physicians to prescribe more efficiently.

Scenario #2: Centralized reimbursement and decentralized pricing

In this scenario, third-party payers in German social health insurance will be able to negotiate with manufacturers about discounts and market shares for generic and therapeutic substitutes. In principle reimbursement decisions will remain centralized as described in scenario #1. However, in contrast to scenario #1, third-party payers will only be obliged to reimburse stand-alone patents and at least one prescription drug per therapeutic or generic group. As a consequence, third-party payers will be able to establish insurer-specific incentive formularies. As a result, there might be no user charges at all for preferred products. In contrast, patients will either have to pay hefty surcharges for therapeutic or generic substitutes that are not part of the insurer-specific formulary or – more consistently – will have to pay the full price for these substitutes out-of-pocket.

However, decentralized negotiations between third-party payers and manufacturers about rebates in return for preferred status on insurer-specific formularies only make sense if third-party payers are able to create sufficient incentives for physicians to increase market shares of preferred products. This is impossible in the current setting of contractual relations between third-party payers and physicians in German social health insurance. In principle, all third-party payers need to contract all willing providers. Selective contracting is limited to very few experimental schemes. Thus, third-party payers are not able to contract selectively. As a consequence, they are not able to gain competitive advantages. However, decentralization of pricing decisions is all about gaining competitive advantages, which only makes sense in a more com-

petitive setting (Greß 2004). Only in a more competitive setting will individual third-party payers be able to design contractual arrangements with physicians to promote prescription drugs with a preferred status.

In this scenario, price competition for therapeutic and generic substitutes will increase. Prices for stand-alone patents are not influenced. Patients will benefit from lower user-charges. Moreover, if third-party payers are able to influence prescription behavior of physicians successfully, patients can ultimately also benefit form lower health care expenses of third-party payers by paying lower premiums. For manufacturers, the consequences of this scenario depend very much on their product portfolio. Price competition will increase for manufacturers that only produce therapeutic and generic substitutes. However, if manufacturers are able to offer a large variety of products, they will probably have a good bargaining position. As a consequence, concentration will increase. The position of producers of stand-alone patents will not change very much. Therefore, incentives for the development of innovative products are even more pronounced than in scenario #1 – if groups for generic and therapeutic substitutes are homogenous.

Scenario #3: Decentralized reimbursement and decentralized pricing

This scenario assumes that third-party payers are free to determine reimbursement and pricing of prescription drugs. However, prescription drugs will still be part of the standardized benefits package of German social health insurance. Individual third-party payers are responsible for making sure that the provision of prescription drugs is adequate. Thus, third-party payers decide which prescription drugs to reimburse in order to fulfill this requirement. As a consequence, third-party payers will also be able to exclude stand-alone patents from reimbursement.

In this scenario third-party payers will attain additional instruments for product differentiation. In return for lower premiums and/or lower co-payments, third-party payers will be able to offer "no-frills" packages of prescription drugs – limited to generic and therapeutic substitutes and some stand-alone patents. "Premium" packages might include more choice of substitutes and stand-alone patents in return for higher premiums and/or higher co-payments. Consequences for patients are rather ambiguous. On the one hand, more choice would be available. As a consequence, consumer choice becomes more important. However, financial consequences for patients might be substantial if stand-alone patents need to be paid out-of-pocket in case of sudden ill health.

Implications for manufacturers in this scenario are also very pronounced. In contrast to scenarios #1 and #2, in this scenario price competition would also apply to stand-alone patents. However, from the experience on the private health insurance market we know that third-party payers are very reluctant to exclude stand-alone patents from reimbursement. Manufacturers of stand-alone patents might even link stand-alone patents to other products of their portfolio. As a consequence the bargaining position of manufacturers that produce only therapeutic or generic substitutes will decrease and concentration of the market will increase.

Conclusions

In this paper we analyze regulation of two important parameters for third-party payers and manufacturers of prescription drugs in a variety of health care systems. First, regulation of reimbursement determines whether a specific prescription drug will be reimbursed by third-party payers or will only be available to patients with a 100 percent co-payment. Second, regulation of pricing determines the price third-party payers have to pay for this specific prescription drug. We distinguish between centralized regulation and decentralized regulation.

We have found that the centralized regulation of reimbursement and pricing prevails in most health care systems. Regulation in German social health insurance stands out as rather unique. In contrast to other countries using centralized regulation, market approval is equivalent to reimbursement. So far the legislator does not allow country-specific formularies. Moreover, cost-effectiveness may not be used to exclude prescription drugs from reimbursement. Pricing regulation in German social health insurance is less restrictive than in other countries, too. Manufacturers are free to determine prices. However, internal referencing sets incentives for manufacturers not to exceed reference prices.

Centralized regulation of reimbursement and prices in German social health insurance is increasingly being placed under pressure. First, expenditures for prescription drugs are increasing constantly and more rapidly than expenditures in other health care

sectors. Third-party payers are unable to control expenditures. Second and more importantly, physicians prescribe a considerable share of prescription drugs that are more expensive than therapeutic or generic substitutes.

Our comparison of different levels of regulation leads to three reform scenarios. In scenario #1 prescription drugs will be excluded from reimbursement if they provide an unfavorable ratio between marginal costs and marginal benefits. If these prescription drugs are reimbursed at all, the price will be the same as for generic or therapeutic substitutes. However, in this scenario third-party payers will have a hard time setting incentives for physicians to control expenditures.

Third-party payers will have a stronger bargaining position in reform scenario #2, which is based on decentralized pricing and centralized reimbursement – similar to social health insurance in Israel. Third-party payers will be able to negotiate with manufacturers about discounts and market shares for genetic and therapeutic substitutes. In contrast to scenario #1, third-party payers will be obliged to reimburse stand-alone patents and at least one prescription drug per therapeutic or generic group. As a consequence, third-party payers will be able to establish insurer-specific incentive formularies. If groups for generic and therapeutic substitutes are homogeneous, incentives for the development of innovative products are even more pronounced than in scenario #1. Moreover, if third-party payers have more instruments to manage care, they will also be able to control expenditures more effectively.

Reform scenario #3 is based on decentralized pricing and decentralized reimbursement – similar to the private health insurance market in the US. Third-party payers will attain additional instruments for product differentiation. However, the consequences for patients are rather ambiguous. Although consumer choice becomes more important, financial consequences for patients can be substantial. Therefore, reform scenario #2 is a viable compromise between consumer protection and a more competitive and cost-effective market for prescription drugs in German social health insurance and other similar markets for prescription drugs.

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Ranking of Countries – The WEF, IMD, Fraser and Heritage Indices

Wolfgang Ochel and Oliver Röhn*

Introduction

For more than 25 years ranking the competitiveness (and economic growth prospects) of countries and their underlying factors has been on the agenda. The interest in ranking has to do with the globalisation of economies. The business community uses rankings as a tool to determine investment plans and to assess locations for new operations. Governments interested in attracting enterprises find information to benchmark their policies against those of other countries. Academics use rankings for cross country analyses.

Rankings well-known to business leaders and policy makers are prepared by the World Economic Forum (WEF), IMD – the International Institute for Management Development –, the Fraser Institute and the Heritage Foundation. They are published annually.[1] Whereas the focus of the first two rankings is on the competitiveness of countries (and obstacles to growth), the last two assess what they consider to be the main factor of economic growth (and prosperity): the degree to which economies are free.

In the following we will present the rankings of the above mentioned organisations. Although the rankings cover many more countries, our main focus will be on the OECD members. We will discuss their general approach and their results, and investigate whether the rankings are related to the future economic performance of these countries. Furthermore, we will have a closer look at the methodology of the rankings: the selection of the determinants of competitiveness, the quality of the data, their standardisation and the weighting procedure when aggregating the variables into composite indicators.

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[1] Our choice of rankings and indicators is rather selective. We do not include important indices prepared by BERI, the Bertelsmann Stiftung, International Country Risk Guide (ICRG), World Bank Doing Business, etc. We also do not refer to indices used primarily in academic research on the determinants of economic performance, such as the Gastil's political rights index (Freedom House index), the World Bank's governance indicators (Kaufmann et al. 1999) and the Hall and Jones (1999) index.

Overview of the indices

Since 1979, the World Economic Forum (WEF) has annually published the World Competitiveness Report. The objective of the report is to assess the comparative strengths and weaknesses of national economies in terms of competitiveness and prospects for growth. The Global Competitiveness Report 2005–2006 presents three index rankings: the Growth Competitiveness Index (GCI), developed by Jeffrey Sachs, the Business Competitiveness Index (BCI), developed by Michael Porter, and the Global Competitiveness Index (Global-CI), developed by Xavier Sala-i-Martin. The GCI we are focusing on tries to measure national competitiveness. The strengths and weaknesses of national economies influence economic growth in a country. The main growth factors are technology, the state of a country's public institutions and the quality of the macroeconomic environment. The role of technology in the growth process differs for countries depending on their stage of development. For "core economies" technological innovation is critical for growth. "Non-core economies" can grow by adopting technologies developed abroad. 21 OECD countries are considered to be "core innovators" with at least 15 patents per million inhabitants in 2003. The GCI is calculated on the basis of 35 sub-indices. The weighting procedure is relatively sophisticated (see Box 1).

Since 1989 the International Institute for Management Development (IMD) has assessed the competitiveness of 51 nations (and 9 regions). The concept of competitiveness is quite similar to that of WEF. IMD distinguishes four main competitiveness factors: economic performance, government efficiency, business efficiency, and infrastructure. Each of these four factors is broken down into five subfactors (see Box 2). The ranking of IMD is based on 241 competitiveness criteria. The subfactors do not necessarily include the same number of criteria. Whereas each subfactor has the same weight in the aggregation process, the 241 criteria are weighted differently (IMD 2005).

The Fraser Institute has been publishing its Economic Freedom of the World index (EFW index) since 10 years. The main objective of the EWF index is not to assess the competitiveness of nations but to measure the differences in the consistency of institutions and policies with economic freedom. The four cornerstones of economic freedom are personal

Box 1

WEF Growth Competitiveness Index (GCI)

Objective: Gauge the ability of countries to attain sustained economic growth.

The GCI is composed of three component indexes:
- the technology index
- the public institutions index and
- the macroeconomic environment index.

These indexes are calculated on the basis of 35 sub-indices, a combination of "survey data (S)" and "hard data (H)". The survey data are from WEF's Executive Opinion Survey. The role of technology in the growth process differs for countries depending on their stage of development. For "core economies" technological innovation is critical for growth. "Non-core economies" can grow by adopting technologies developed abroad. "Core economies" are countries with more than 15 US utility patents registered per million inhabitants.

The weights for core (C) and non-core (N-C) countries differ (weights are given in parentheses):

Component indexes	Sub-indices	Data
Technology (C: 1/2; N-C: 1/3)	Innovation (C: 1/2; N-C: 1/8)	4 S and 2 H (S: 1/4; H: 3/4)
	Technology transfer (C: 0; N-C: 3/8)	2 S
	Information and communication technology (C: 1/2; N-C: 1/2)	5 S and 5 H (S: 1/3; H: 2/3)
Public institutions (C: 1/4; N-C: 1/3)	Contracts and law (C: 1/2; N-C: 1/2)	4 S
	Corruption (C: 1/2; N-C: 1/2)	3 S
Macroeconomic environment (C: 1/4; N-C: 1/3)	Macroeconomic stability (C: 1/2; N-C: 1/2)	2 S and 6 H (S: 2/7; H: 5/7)
	Country credit ranking (C: 1/4; N-C: 1/4)	1 H
	Government spending (C: 1/4; N-C: 1/4)	1 S

Sub-indices = Unweighted average of data if weights are not given.
The weights are based on regression analysis results (McArthur and Sachs 2001).

Source: World Economic Forum (2005).

Box 2

IMD World Competitiveness Yearbook (WCY)

Objective: Assessment of the competitiveness of 51 nations and 9 regions. Ranking the ability of nations to create and maintain an environment that sustains the competitiveness of enterprises and promotes economic growth.

The WCY divides national environment into four main competitiveness factors. Each of these four factors has been broken down into five sub-factors:

Economic performance	*Government efficiency*	*Business efficiency*	*Infrastructure*
Domestic economy	Public finance	Productivity	Basic infrastructure
International trade	Fiscal policy	Labour market	Technological infrastructure
International investment	Institutional framework	Finance	Scientific infrastructure
Employment	Business legislation	Management practices	Health and environment
Prices	Societal framework	Attitudes and values	Education

The WCY is based on 241 competitiveness criteria: 128 hard data and 113 survey data. The survey data are drawn from the IMD Annual Executive Opinion Survey.

The sub-factors do not necessarily include the same number of criteria. Each sub-factor, independently of the number of criteria it contains, has the same weight in the aggregation procedure that is 5 percent (20 x 5 = 100). Within each subgroup survey data receive a weight of 0.5 and hard data of 1.0.

Source: IMD (2005).

Box 3

Fraser Institute: Economic Freedom of the World (EFW index)

Objective: The measurement of differences in the consistency of institutions and policies with economic freedom. Key ingredients of economic freedom are personal choice, freedom of exchange, freedom to enter and compete in markets and protection of private property.

The EFW index measures the degree of economic freedom present in five major areas:
- Size of government: Expenditures, taxes and public enterprises,
- Legal structure and security of property rights,
- Access to sound money,
- Freedom to trade internationally,
- Regulation of credit, labour and business.

Within the five major areas, 21 components are incorporated into the index but many of those components are themselves made up of several sub-components. The index uses 38 distinct pieces of data. Nearly half of them are survey data supplied by WEF and IMD surveys. Each component is placed on a scale from 0 to 10.

The component ratings within each area are averaged to derive ratings for each of the five areas (regression estimates were used to adjust the area ratings for the countries without survey data). In turn, the summary rating is the average of the five area ratings.

Source: Fraser Institute (2005).

choice rather than collective choice, exchange coordinated by markets rather than allocation via the political process, freedom to enter and compete in markets, and protection of persons and their property from aggression by others. These four cornerstones require governments to do some things but refrain from doing others. According to the Fraser Institute, governments can promote or reduce economic freedom in five major areas: size of government, the legal system, access to sound money, freedom to trade and regulations of credit, labour and business (see Box 3). These areas are subdivided by components and subcomponents with a total of 38 criteria. The aggregation of subcomponents and components is carried out by using unweighted averages (Fraser Institute 2005).

The Index of Economic Freedom of the Heritage Foundation pursues the same objectives as the EFW index. A list of 50 independent factors is divided into 10 broad factors of economic freedom (see Box 4). The 50 independent variables which determine the 10 broad factors are weighted by the experts of the Heritage Foundation. The overall score is determined by weighting the 10 factors equally (Heritage Foundation 2005).

Box 4

Heritage Foundation Index of Economic Freedom

Objective: Systematic, empirical measurement of economic freedom. Economic freedom is defined as the freedom of people to work, produce, consume and invest in the ways they feel are most productive.

The Index is not designed to measure how much each determinant of economic freedom adds to economic growth, although it is acknowledged that economic freedom promotes economic growth.

The 2005 Index of Economic Freedom measures 155 countries against a list of 50 independent variables divided into ten broad factors of economic freedom:
- Trade policy,
- Fiscal burden of government,
- Government intervention in the economy,
- Monetary policy,
- Capital flows and foreign investment,
- Banking and finance,
- Wages and prices,
- Property rights,
- Regulation and
- Informal market activity.

The 50 independent variables are analyzed to determine for each of the 10 factors a score on a scale running from 1 to 5. A score of 1 signifies high economic freedom, while a score of five indicates low economic freedom. All 10 factors are considered to be equally important to the level of economic freedom. Thus, to determine a country's overall score, the factors are weighted equally.

Source: Heritage Foundation (2005).

Comparing the ranking results

Table 1 presents the results of the four rankings for OECD countries (but omits the rankings of the other countries). With respect to the average ranking the United States, Switzerland, Denmark, Iceland and Australia are the top five countries. However, none of these five countries is a top performer in all four rankings. The middle group consists of Sweden, the Netherlands, Germany, Japan, Spain, etc. The countries with the lowest ranking are Slovakia, Greece, Poland, Mexico and Turkey.

In order to check how similar the four rankings are, a rank correlation (Spearman index) is employed. Table 2 shows that the mean correlation coefficients

Table 1

Ranking results

Rank	WEF GCI 2006[a]	score	IMD 2005[b]	score	Fraser 2003[c]	score	Heritage 2005[d]	score	Average ranking[e]	
1	FIN	5.94	USA	100.0	NZL	8.20	LUX	1.63	USA	3.8
2	USA	5.81	ICE	85.3	CHE	8.20	IRL	1.70	CHE	5.5
3	SWE	5.65	CAN	82.6	USA	8.20	NZL	1.70	DNK	6.0
4	DNK	5.65	FIN	82.6	GBR	8.10	GBR	1.75	ICE	6.0
5	ICE	5.48	DNK	82.5	CAN	8.00	DNK	1.76	AUS	7.2
6	CHE	5.46	CHE	82.5	IRL	7.90	ICE	1.76	FIN	7.3
7	NOR	5.40	AUS	82.0	AUS	7.80	AUS	1.79	NZL	7.8
8	AUS	5.21	LUX	80.3	LUX	7.80	CHE	1.85	CAN	8.0
9	NLD	5.21	IRL	77.8	AUT	7.70	USA	1.85	LUX	8.8
10	JPN	5.18	NLD	77.4	DNK	7.70	SWE	1.89	GBR	8.8
11	GBR	5.11	SWE	76.3	ICE	7.70	FIN	1.90	IRL	9.0
12	CAN	5.10	NOR	76.2	NLD	7.70	CAN	1.91	SWE	10.5
13	DEU	5.10	NZL	75.5	FIN	7.60	NLD	1.95	NLD	11.0
14	NZL	5.09	AUT	74.3	DEU	7.50	DEU	2.00	AUT	13.5
15	KOR	5.07	JPN	68.7	BEL	7.40	AUT	2.09	NOR	13.5
16	AUT	4.95	GBR	68.5	HUN	7.40	BEL	2.13	DEU	14.5
17	PRT	4.91	DEU	67.8	NOR	7.30	ITA	2.28	JPN	17.0
18	LUX	4.90	BEL	67.5	SWE	7.30	NOR	2.33	BEL	17.8
19	IRL	4.86	KOR	64.2	JPN	7.20	ESP	2.34	ESP	20.5
20	ESP	4.80	FRA	64.2	ESP	7.20	CZE	2.36	HUN	20.8
21	FRA	4.78	CZE	60.1	PRT	7.10	HUN	2.40	KOR	20.8
22	BEL	4.63	HUN	59.9	KOR	7.00	SVK	2.43	PRT	21.5
23	CZE	4.42	ESP	59.4	FRA	6.90	PRT	2.44	CZE	22.0
24	HUN	4.38	SVK	58.6	GRC	6.90	JPN	2.46	FRA	22.5
25	SVK	4.31	PRT	52.4	CZE	6.80	POL	2.54	ITA	24.5
26	GRC	4.26	TUR	51.3	ITA	6.60	FRA	2.63	SVK	24.5
27	ITA	4.21	GRC	50.3	SVK	6.60	KOR	2.63	GRC	26.3
28	POL	4.00	ITA	45.8	MEX	6.50	GRC	2.80	POL	28.0
29	MEX	3.92	MEX	41.5	POL	6.10	MEX	2.89	MEX	28.8
30	TUR	3.68	POL	39.0	TUR	5.90	TUR	3.46	TUR	29.0

[a] Range of scores from 1 to 7 (best). – [b] Scores between 0 and 100 (best). – [c] Scores between 0 and 10 (best). – [d] Scores range from 1 (best) to 5. – [e] Average of the four ranking positions.

Sources: World Economic Forum (2005); IMD – International Institute for Management Development (2005); Fraser Institute (2005); Heritage Foundation (2005).

of the four rankings vary between 0.73 (WEF) and 0.82 (IMD). The highest correlations are found between WEF and IMD (0.87) and between Fraser and Heritage (0.87). These results reflect the fact that the WEF index and the IMD index focus on competitiveness and economic growth whereas the main objective of Fraser and Heritage is to assess the economic freedom of countries. Therefore, WEF and IMD, on the one hand, and Fraser and Heritage, on the other hand, use similar variables for their rankings. The lowest correlations are found between Heritage and WEF (0.63) and between Fraser and WEF (0.68).

Table 2

Spearman correlation coefficients of the rankings

	WEF	IMD	Fraser	Heritage	Mean
WEF	1	0.87	0.68	0.63	0.73
IMD	0.87	1	0.83	0.78	0.82
Fraser	0.68	0.83	1	0.87	0.79
Heritage	0.63	0.78	0.87	1	0.76

Source: CESifo calculations based on Table 1.

In addition to rank correlations, the extent to which individual countries change their position when different indices are used demonstrates how similar the rankings are. Table 3 shows the deviation between the highest and the lowest position of the four rankings for individual countries. Whereas the deviation is very low for Australia and Mexico and rather low for several other countries it is high for Luxembourg, Ireland, Sweden, Japan and New Zealand. The high deviations are the result of different rankings of

Table 3

Greatest deviation of rankings[a)]

AUS	1	DNK	6	ITA	11
MEX	1	FRA	6	NOR	11
DEU	4	CHE	6	FIN	12
GRC	4	AUT	7	KOR	12
NDL	4	BEL	7	GBR	12
ESP	4	HUN	8	NZL	13
TUR	4	PRT	8	JPN	14
CZE	5	USA	8	SWE	15
POL	5	CAN	9	IRL	17
SVK	5	ICE	9	LUX	18

[a)] Deviation between the highest and the lowest position of the four rankings.

Source: CESifo calculations based on Table 1.

WEF on the one side and Fraser and Heritage on the other side. Whereas WEF attributes a relatively high degree of competitiveness to Sweden (rank 3) and Japan (rank 10), their economic freedom is considered to be low: rank 18 (Fraser) and rank 24 (Heritage), respectively. The opposite is true for the other three countries: they receive low rankings with regard to competitiveness and high rankings with regard to economic freedom (Table 1).

The indices and subsequent growth: Some simple correlations

One reason why composite indices have received a great deal of attention recently might be borne by the expectation that they can help explain differences in future economic performance. Politicians and the business community are especially interested in future growth prospects. Both the WEF and IMD indices try to measure the competitiveness of nations. Competitiveness seems closely related to the growth prospects of a country, and WEF explicitly states that it analyzes "the extent to which individual national economies have the structures, institutions and policies in place for economic growth over the medium term, roughly a perspective of five years" (McArthur and Sachs 2001, 28).

Figures 1 and 2 depict some simple correlations between the index values in 2001 and the average per capita growth rate over the period 2000–04. In both cases there appears to be no systematic relationship between the index values and subsequent growth. While there is a slight positive, although not significant, correlation between the WEF index and the average growth rate, the correlation is even negative in the case of the IMD index.[2]

In contrast to IMD and WEF, Heritage and Fraser try to assess the economic freedom of countries. While the competitiveness of nations might impact economic growth in the shorter run, the effect that economic freedom exerts on a country's economic performance is likely to be only in the longer run.

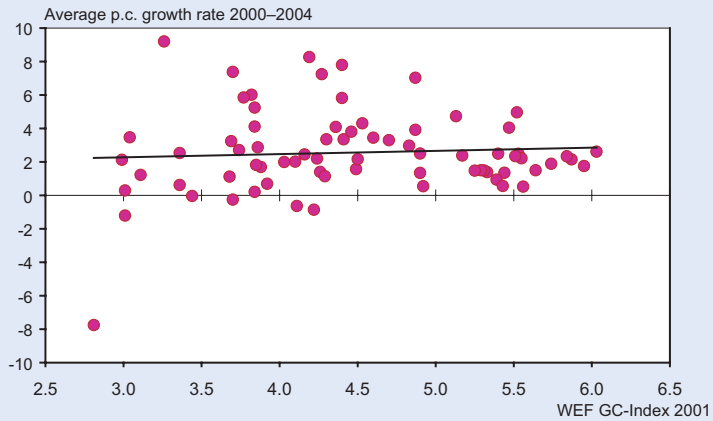
Figure 3 plots the country values of the Fraser index in 1980 and the average per capita growth rate over the period 1980–2004. Although there appears to be a lot of unexplained variation in cross country per capita growth rates, the relationship is clearly positive (and significant). In the case of the Heritage index we are restricted to a period of about ten years as the index only dates back to 1995. As is apparent from Figure 4 there does not seem to be a clear connection between the index and subsequent growth.[3] However, a period of about ten years might not be

[2] One might object to our choice of the growth period under study as it is likely to be influenced by the burst of the New Economy bubble and therefore may not be representative. We are, however, restricted to this period since the version of WEF's Growth Competitiveness Index discussed in this article was not introduced until 2001.

[3] The correlation is slightly positive (yet insignificant), which is unintuitive for the case of the Heritage index since *higher* index values represent *lower* economic freedom.

Figure 1

RELATIONSHIP BETWEEN WEF GC-INDEX AND GROWTH

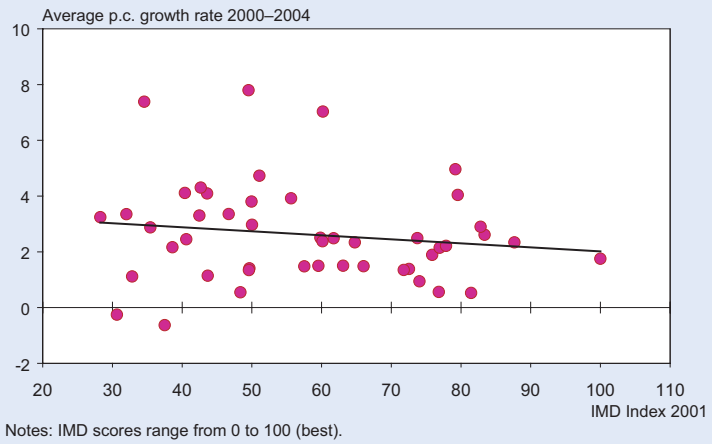


Notes: GCI scores range from 1 to 7 (best).

Source: CESifo.

Figure 2

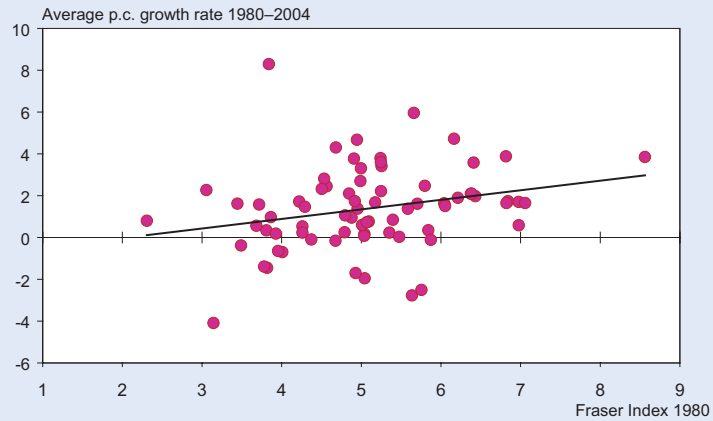
RELATIONSHIP BETWEEN IMD INDEX AND GROWTH



Notes: IMD scores range from 0 to 100 (best).
Source: CESifo.

Figure 3

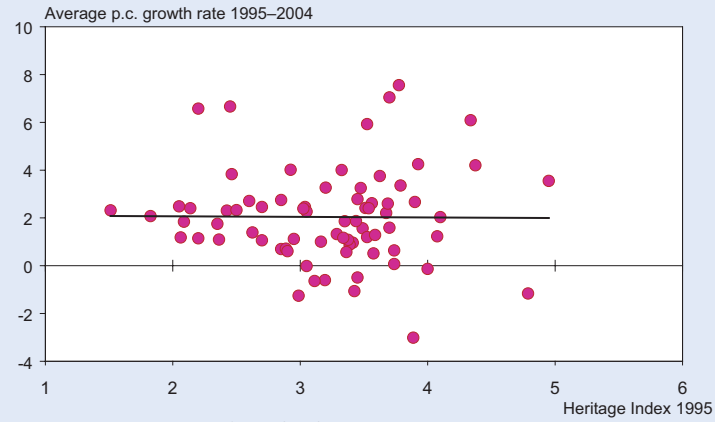
RELATIONSHIP BETWEEN FRASER INDEX AND GROWTH



Notes: Fraser scores range from 0 to 10 (best).
Source: CESifo.

Figure 4

RELATIONSHIP BETWEEN HERITAGE INDEX AND GROWTH



Notes: Heritage scores range from 1 (best) to 5.
Source: CESifo.

enough to uncover the effects of economic freedom on growth.

Clearly, the simple correlations reported in this section should not be mistaken as a robust statistical analysis of the predictive ability of the indices for future growth. Still, the weak correlations – with the exception of the Fraser index – suggest a rather limited use of these indices to assess future growth prospects. In the following sections we turn to investigate the crucial steps in constructing these composite indices.

Selected variables

The quality of our four indexes depends among other things on the selection of variables. The choice of the variables should be based on the theoretical and empirical relevance of the phenomenon being measured and on their measurability.

The focus of the WEF index is on competitiveness and economic growth. Drawing on the economic growth literature and research at the Centre for International Development at Harvard University, McArthur and Sachs (2001) tested the links of more than a dozen sub-indices with GDP per capita growth between 1992 and 2000 for a sample of 75 economies. They created indices for three broad factors that proved to be linked to economic growth: technology, public institutions and macroeconomic environment. Technology is subdivided into the sub-indices innovation (overall level of innovation, company R&D spending relative to international peers, private sector R&D collaboration with local universities, gross tertiary enrolment

rate, etc.), technology transfer (direct investment as a source of new technology and technology-in-trade), and information and communication technology (Internet access in schools, number of mobile telephone users, Internet users per capita, etc.). The public institutions index consists of economies' average score on questions concerning neutrality in government procurement, judicial independence, clear delineation and respect for property rights, corruption etc. The macroeconomic environment index measures the overall stability of a country's macro economy, the short-term outlook of private agents and the share of government expenditures as a percentage of GDP (see Box 1).

Although the WEF GCI includes important growth factors, it is not at all comprehensive. The empirical literature on the determinants of economic growth points to additional factors such as geography, human resources, health, religion, social capital and infrastructure (Durlauf et al. 2004, App. 2). With special reference to OECD countries, Bassanini et al. (2001) have demonstrated that government revenues as percentage of GDP, high government transfers as opposed to government investment, high direct taxes, etc., are (negatively) associated with growth and should not be omitted when ranking the growth prospects of countries. Furthermore public institutions have been captured by WEF in a very general way, whereas concrete product market regulations, labour market institutions and regulations of entrepreneurial activities have not been included (Nicoletti and Scarpetta 2003). And finally indicators for market efficiency, competitive policy and trade openness have been neglected (Ahn and Hemmings 2000; OECD 2003).

The exclusion of the above-mentioned growth factors may be because WEF produces a business competitiveness index in addition to the GCI. The BCI refers to the microeconomic foundations of competitiveness and includes some of the growth factors omitted by the GCI. Another reason for the exclusion of some growth factors may have been their low impact on economic growth shown by the test undertaken by McArthur and Sachs. Unfortunately the test results are not published (McArthur and Sachs 2001). Anyhow, the omission of growth factors should have contributed to the low explanatory power of the GCI for economic growth.

Whereas WEF's GCI omits important growth factors, IMD has included a rather comprehensive set of growth factors in constructing its WCY index. Starting from four dimensions that shape a country's competitiveness environment (attractiveness vs. aggressiveness; proximity vs. globality; assets vs. processes and individual risk taking vs. social cohesiveness) four competitiveness factors with twenty subfactors (see Box 2) are deduced (Garelli 2001). The IMD index is a business school product. The knowledge of many business leaders has been used in order to select the main determinants of competitiveness and growth. The index is meant to be a guide for firms' locational decisions. The 241 indicators facilitate detailed descriptions of the countries. However, the IMD approach has two disadvantages. Performance indicators and impact factors are mixed although they cannot be influenced by policy to the same extent (Heinemann et al. 2004, 18–22). And even more critical: No theoretical or econometric approach is used in order to identify the most important growth factors. Their choice seems to be carried out quite subjectively (Drews 2005, 201–212).

The WEF and IMD assume that the growth process follows the same rules and is based on the same growth factors in all countries. The only exception is the distinction between "core" and "non-core" countries made by WEF. This distinction implies that additional factors are used in order to characterize the transfer of technology in "non core" countries. Apart from this exception both approaches assume linearity in the growth process for all countries. This assumption is, however, not very realistic. Durlauf and Johnson (1995) have shown that there are groups of countries with different structural characteristics and initial conditions which determine the growth process in a different way. By using classification and regression tree methods, they subdivide 96 countries into four "convergence clubs" with nonlinear growth processes. The OECD countries belong mainly to two different groups. Subsequent research has reinforced Durlauf and Johnson's findings of multiple "convergence clubs", although the discussion on growth convergence is continuing (for an overview see Durlauf et al. 2004, 89–96; Hemmer and Lorenz 2004, chapter 7). Not taking into consideration nonlinearities in the growth process and not selecting different indicators for each "convergence club" is a weakness of the IMD index and to a lesser extent of the WEF index.

The main objective of the Fraser index and of the Heritage index is not to assess the growth prospects of countries but to measure economic freedom. The meaning of economic freedom was discussed at sev-

eral conferences at the Fraser Institute and inspired by liberal and institutionalist thinking. By taking institutions into consideration, a fundamental precondition for a favourable long-term economic performance is addressed. There was agreement that the four key ingredients of economic freedom mentioned above should be the guideline for governmental activities. Governments should be of limited size, should establish a legal structure that provides for the even-handed enforcement of contracts, the security of property rights, etc., and should facilitate access to sound money. In addition, the freedom to international trade should be guaranteed, credit and labour markets should be regulated appropriately and the entry into business activities not restricted. The Fraser index selects 21 components in 5 major areas (see Box 3). It reflects the essence of a free private market and represents an "ideal" state in which a limited government guarantees some fundamental prerequisites for this market. Focusing on economic freedom the Fraser index does not include growth factors common to the WEF and IMD indexes. It therefore seems obvious that it cannot explain economic growth adequately at least in the shorter to medium run.

The Heritage Foundation Index defines economic freedom in a way similar to the Fraser Institute. Economic freedom is understood as the absence of government coercion or constraint on the production, distribution, or consumption of goods and services beyond the extent necessary for citizens to protect and maintain liberty itself (Beach and Miles 2005). Ten areas are identified with a total of 50 independent variables that grade each country's level of economic freedom (see Box 4). Many of them are institutional factors like the top marginal income tax rate, restrictions on foreign ownership of business, minimum wage laws, legally granted and protected private property, labour regulations, etc. Explanations are given as to why these variables are chosen and how they are related to economic freedom. Although the explanations are not unconvincing, the choice of variables is somehow subjective.

Data

The indices are calculated on the basis of hard data and survey data. The WEF uses 14 hard data and 21 survey data, IMD 128 hard data and 113 survey data, Fraser 19 hard data and 19 survey data, whereas in the case of the Heritage Foundation hard data prevail. Hard data are taken from statistics of international organisations. While their use is unproblematic the use of survey data is not. Survey data are generated by the WEF's and IMD's executive opinion surveys and are also used by Fraser.

The WEF Executive Opinion Survey captures the perceptions of executives on obstacles to growth in more than 100 countries. The survey is carried out among business executives and entrepreneurs with some international activity in enterprises ranging from smaller companies of 50 employees to very large multinationals. The sample of firms covers a variety of industries and is composed of a cross-section of domestic private-sector firms, foreign owned firms and firms with government participation. In 2004 more than 2,100 executives from 30 OECD member countries took part in the survey with 226 from Turkey (greatest sample) and 20 from Sweden (minimum sample; WEF 2004, 199–208). IMD surveys executives in top and middle management representing a cross-section of the business community in each country or region. The participants are nationals with international experience or expatriates. In 2005 IMD surveyed 4000 executives from 60 economies (Rosselet-McCauley 2005).

The surveys provide qualitative information on concepts that are difficult to measure. They capture the perceptions of executives on the environment in which they work. The executives express their views on the issues that they believe are the cause of constraining economic growth in their country. Compared to hard data, survey data are more recent and sometimes closer to reality. However, the survey data also have their shortcomings.

One precondition for good survey results is a high quality questionnaire. The questions should be clear, be based on appropriate concepts to capture the different subjects and should not be similar. These preconditions are not always fulfilled. For instance the question about a country's level of "technological readiness" (WEF: question 3.01) is ambiguous. Which technology is meant? And what does "world leaders" mean, who serves as a benchmark? What does it mean "to be aggressive in absorbing new technology"? (WEF: 3.02). And which institutions are included when assessing the quality of scientific research institutions (WEF: 3.05; Lall 2001, 1518)? Furthermore, the questions are not always based on clear concepts. Just to give one example: in order to assess the impact of the wage bargaining system on

wages, the coordination of wage bargaining must also be taken into consideration, not only centralization, as in the survey. (WEF: 9.19). And finally there are quite a lot of repetitive questions that do not add meaningful new information.

The other precondition for good survey results is high quality responses. In order to meet this requirement, the participants of the survey should be selected carefully and the sample should be representative. Furthermore, the respondents should use the same benchmarks when comparing their countries with other countries. These conditions are also not always fulfilled. There is no doubt that the business executives of the panels are experts and have an excellent knowledge of the economic environment of their countries. However, they do not represent all stakeholders that influence competitiveness and economic growth, such as union leaders, politicians and scientists. Beyond that, executives will have difficulties employing the same standard in assessing institutional and policy arrangements to take into account the relative position of a country in relation to other countries. These difficulties are exemplified by the assessment of hiring and firing practices in different countries. With scores ranging from one to seven, Germany with a score of 2.2 occupies place 102 among 104 countries, just ahead of France (place 103), but behind Portugal, Spain, Greece and Turkey (WEF 2004, 599). At the same time, the OECD (2004, 117, column 13) considers Germany's hiring and firing regulations to be less restrictive than those of the countries just mentioned. The difference in the ranking may be due to the assessment being based on different conceptual approaches. But one cannot exclude the possibility that German executives approached the task of assessing Germany's labour market flexibility in a more "pessimistic" frame of mind than their foreign counterparts with respect to their own countries. The WEF could make the assessment standard more comparable between the countries involved by engaging the executives in an organised exchange of views.

Although the perceptions of executives provide important information when ranking growth prospects of countries, the quality of the surveys raises some doubts on the reliability of these rankings.

Standardization

Variables underlying a composite indicator usually come in a variety of different statistical units. In order to aggregate variables into a composite indicator the variables need to be normalised or standardised to a common scale. The most commonly used normalisation methods are simple (often linear) transformations of the underlying data that do not influence the ranking of countries within an individual indicator. The choice of the standardisation or normalization method can, however, impact country rankings when the individual indicators are aggregated into a composite indicator (see Freudenberg 2003 and Matthes and Schröder 2004 for examples). The basic intuition being that relative distances between country values within the original indicator are influenced by the transformation method.

Heritage's Index of Economic Freedom uses the *score classes method* (also *categorical scaling method*) to assign a country a score between 1 and 5 for each of its 10 factors. A score of 1 signifies an economic environment or set of policies that are most conducive to economic freedom, and a score of 5 represents the least favourable environment for economic freedom (Heritage 2005). In general, this method assigns each variable a score depending on whether its value is below or above a certain threshold. For instance, a country receives a score of 1 in the trade policy factor if the weighted average tariff rate is equal to or below 4 percent, a score of 2 if the weighted average tariff rate is between 4 percent and 9 percent and so forth. Additionally, however, Heritage uses expert assessments to determine the final score and assigns a country an additional point if there are substantial non-tariff barriers or ample evidence for corruption within the customs authorities.

Fraser's EFW index and the GCI of WEF employ both the *score classes method* and *continuous scaling methods* based on linear interpolations to normalize the underlying indicators to lie within a scale of 0–10 (EFW) and 1–7 (GCI). In contrast to the score classes method, continuous scaling methods transform the underlying indicator values into a continuous, uniform scale that retains the relative distances between the original values (Matthes and Schröder 2004). The basic equation for this class of standardisation methods is $X = (I-a) / b$, where "I" is the original value of the indicator and "a" and "b" are constants to be chosen. Both Fraser and the WEF use the distance from the best and worst performer ("Min-Max" method) to transform the original indicators into a range between 0 and 1. According to

this approach, "a" is the minimum indicator value I_{min} and "b" is equal to the distance between the highest and lowest indicator value ($I_{max} - I_{min}$).[4] In a second step, EFW and GCI linearly transform these values to lie within a range of 0 and 10 and 1 and 7, respectively.

IMD also employs a continuous scaling method to transform all original indicators into a common scale. Yet they use a slightly different linear interpolation method. All original indicator values are transformed into a standardised distribution with mean 0 and standard deviation of 1. It follows that "a" is equal to the mean of an indicator and "b" is equal to the standard deviation of the indicator values. This procedure again assures a common scale for all indicators and, thus, renders aggregation into a composite indicator possible. The resulting composite indicator is additionally transformed according to the "Min-Max" method described above to take values between 0 and 100. This last step is done for illustrative purposes only and does not influence the final ranking.

The *score classes method* provides a reasonable approach to quantify information that would otherwise not be measurable. An example could be expert assessments about the legal framework of a country or the security of property rights. Yet, the method exerts several weaknesses if the underlying indicators represent hard or quantifiable data. Heritage's index and in parts Fraser's index rely on this approach to rescale hard data. First, the score classes method discards valuable information regarding the relative differences of indicator values. On the one hand relatively large differences in the underlying indicator can result in the same score, marginal differences on the other hand can lead to discrete jumps in the score classes. To illustrate this point, consider two countries that impose an average tariff rate of 4.1 percent and 8.9 percent, respectively. Both countries would receive a score of 2 in Heritage's trade policy factor. In contrast, a third country with a slightly higher tariff rate of 9.1 percent than the second country, would receive a score of 3. A second problem arises with regard to the definition of the decisive thresholds. In principle, these thresholds could be theoretically justified. If such a justification is lacking, however, the classification becomes arbitrary. This limitation is not confined to hard data but also applies if the underlying indicator represents soft data. In the case of Heritage and Fraser these theoretical considerations are not evident and hence the thresholds seem at least questionable. The allegation of subjectivity is further aggravated in the case of Heritage by the inclusion of expert assessments to determine the final score.

Proportional continuous scaling methods based on linear interpolations avoid distortions due to discrete jumps and preserve the information about relative distances in the original indicator values at the same time. These approaches are, however, problematic if even distributions, where most of the country values are centred around the mean indicator value, are combined with uneven distributions with extreme indicator values into a composite indicator (Matthes and Schröder 2004). The intuition is simple. The presence of countries with extreme indicator values results in a large denominator "b" and small standardized variables if "I" is small. Therefore, differences in the middle part of the distribution of the original indicator are compressed. This in turn implies that important yet relatively small differences within the original indicator values are obscured by continuous scaling methods based on linear interpolations in the presence of extreme outliers. Thus, when aggregating even and uneven distributions, differences in the latter are implicitly down weighted and not properly reflected in the composite indicator. This problem is more pronounced in the "Min-Max" method used by Fraser and WEF than in the "standard deviation from the mean" method employed by IMD.

The outlier problem can of course be avoided if extreme values are completely neglected. This approach is chosen in part in the Growth Competitiveness Index of WEF. A more sophisticated method is proposed by Matthes and Schröder (2004). They suggest a two-step procedure, where the first step involves a linear transformation similar to the "standard deviation from the mean" method described above. In the second step, however, they employ a logistic function. The advantage of the logistic transformation is that extreme values are forced into a given range (e.g. 0–100) and the "compression effect" of the first step is mitigated. Further, this approach allows the flexibility – by appropriate choice of a constant – to account for different degrees of "uneveness" in the underlying distribution. A related approach is employed in the Bertelsmann Index (Hafemann and van Suntum 2004; Kladroba 2005).

[4] If lower values of an indicator are better, the nominator of the basic equation changes to $I_{max} - I$.

Weighting

After the variables have been normalized they are typically aggregated into a composite index in the following form:

$$CI = \Sigma\, w_i\, x_i,$$

where "x_i" is a normalised variable, "w_i" is a weight attached to "x_i", and $\Sigma\, w_i = 1$.[5] Usually the weighting approach proceeds in two stages. First, the underlying indicators are organized into "thematic" sub-groups and weights are assigned to the variables within a sub-group to derive a sub-index. Second, the sub-indices are weighted to build a composite indicator. The weighting approach is crucial, since the overall index and hence the country ranking is in general heavily influenced by the weighting scheme. This is the more pronounced, the more polarised the country profiles with regard to the underlying indicators, i.e. the more a country is characterized by extreme (both high and low) indicator values (Freudenberg 2003).

The weights assigned to each component reflect their relative importance in the composite index. Hence, the weights should ideally be based on an underlying theoretical framework. The lack of clear theoretical guidance in the weight selection process induces many authors of composite indices to assign equal weights to each component. In fact, this is the approach chosen by IMD, Fraser and Heritage. In the first step, the universe of basic indicators are grouped into 20 (IMD), 10 (Heritage) and 5 (Fraser) sub-indices. In the second step all sub-indicators are assigned equal weights in the composite index. The two-step procedure assures that subindices with a greater number of underlying indicators are not automatically overestimated. Common weighting implies, however, that all subindices are of equal importance, which seems questionable with the indices at hand. Further, equal weighting together with the linear aggregation rule specified in the equation above presumes that all indicators are perfect substitutes. A decrease of one point in one indicator or sub-index can be fully compensated by an increase of one point in any other sub-index. Finally, a further problem of equal weights arises in the presence of highly correlated components of a composite indicator. High correlation between sub-components might indicate that the two indicators are measuring the same underlying concept. Thus, if two correlated indicators or sub-indices are included in a composite index the unique dimension they represent is double counted, biasing the index towards that dimension.

The use of statistical techniques can avoid equal or arbitrarily chosen weights even in the absence of a clear theoretical framework. Statistical methods exploit common dependencies among the underlying indicators and, thus, let the data endogenously determine the weights. If the target variable is sufficiently specified and measurable the weights can be based on regression analysis. The GCI of the WEF employs regression analysis with the average growth rate as the dependent variable to establish the weights of its three subcomponents as well as the weights within these subcomponents. Their cross sectional analysis also reveals that the weights of the components should differ between the core and non-core countries. Even though simple cross sectional regression analysis is more objective and superior to equal or subjective weighting schemes, the method also has certain limitations.[6] First, simple correlations between the dependent and the independent variable cannot establish causality. Further, even if there might be a cause and effect relationship, the direction of causality is unknown without further analysis. The issue seems especially important in the case of the GCI, since the components of the index are regressed on past growth instead of future growth to establish the weights. Moreover, some of the included variables, in particular indicators based on survey data, seem likely to be influenced by the growth performance instead of being its cause. Second, cross country analysis cannot account for the specific characteristics of individual countries. This problem becomes more pronounced as the sample of included countries increases and the more heterogeneous the countries under study are. The GCI partly corrects for this issue by allowing the weights to differ between developed and developing countries. In principle, both the problem of causality and country heterogeneity can be more adequately addressed using panel data. However, long-time series are usually scarce, especially for the wide range of indicators employed and countries analysed.

[5] We focus on linear aggregation rules since all indices discussed here follow this simple rule. Linear aggregation implies that all indicators are *mutually preferentially independent,* i.e. the trade-off ratio between two variables given by the weights is independent of the values of all other variables. This might be an undesirable feature. For a detailed discussion see e.g. Munda and Nardo (2003). For other aggregation rules see e.g. Giovanni et al. (2005).

[6] It should be stated that the authors of the GCI acknowledge some of these limitations, see e.g. WEF (2001, chapter 1.1).

Principle Component (PCA) or Factor Analysis (FA) offer an alternative way to statistically establish weights. These methods are applicable even in the absence of a well specified and measurable target variable. They are especially appealing in the presence of highly correlated indicators or subcomponents. Both methods are designed to reduce the dimensionality of the underlying set of indicators into a smaller set of uncorrelated components or factors preserving the maximum amount of information contained in the variables. The weight each variable receives in a common factor is derived from the correlation matrix and therefore reflects the common dependencies among indicators. Factor analytical techniques are for example employed in the construction of the OECD Product Market Regulation Indices (Nicoletti et al. 2000).[7] It should be noted, however, that PCA and FA are not exempt from subjectivity. Different factor analytical methods lead to different weights as well as the different rotation methods used to increase the interpretability of the factors. Moreover, there is no unique rule as to how many factors should be retained.

Apart from theoretical and empirical considerations weights can also reflect the quality of the data. For example lesser weight could be given to variables that suffer most from missing values. Higher weight could also be assigned to indicators from reliable sources (e.g. international organizations). This procedure might of course penalize developing countries whose data is in most cases not as readily available as that of more developed countries. The WEF incorporates this idea into its GCI by assigning lower weight to indicators based on survey data.[8]

Conclusions

With the on-going integration of global markets, country rankings become more interesting to the business community and governments. WEF, IMD, the Fraser Institute and the Heritage Foundation have prepared the most well-known rankings. They focus on the competitiveness or the economic freedom of countries.

The ranking results for the OECD countries are quite similar for WEF and IMD on the one hand and for Fraser and Heritage on the other hand, although there are differences between them. The simple correlations we have identified suggest that none of the indices is able to explain a large share of the variation in cross country growth rates and the correlations are rather weak – with the exception of Fraser's index – at least for the time periods under study.

The selection of variables and their weighting are the crucial steps in building composite indicators. The choice of growth factors (especially in the case of the WEF GCI) is not at all comprehensive and is usually not scrutinized by econometric tests. Nonlinear relationships are left unexplored. Especially for IMD, Fraser and Heritage the weighting procedures are rudimentary as they lack a theoretical or statistical foundation. Apart from the selection and weighting of variables the heavy dependence on survey data seems problematic in particular owing to their questionable reliability. Further, the standardisation methods used are likely to yield additional distortions and are not checked for robustness.

Although the rankings provide much useful information on individual countries their methodology is in general rudimentary and calls for further improvement.

Abbreviations

AUS	Australia	IRL	Ireland
AUT	Austria	ITA	Italy
BEL	Belgium	JPN	Japan
CAN	Canada	KOR	Korea
CHE	Switzerland	LUX	Luxembourg
CZE	Czech Republic	MEX	Mexico
DEU	Germany	NLD	Netherlands
DNK	Denmark	NOR	Norway
ESP	Spain	NZL	New Zealand
FIN	Finland	POL	Poland
FRA	France	PRT	Portugal
GBR	United Kingdom	SVK	Slovak Republic
GRC	Greece	SWE	Sweden
HUN	Hungary	TUR	Turkey
ICE	Iceland	USA	United States

[7] Both Heritage (Roll 2004) and Fraser (Fraser 2005, ch.1 footnote 4) claim to have checked the robustness of their weighting methodology by means of PCA and FA. They state that the results do not contradict their assumption of equal weights.
[8] A more extensive overview of existing weighting procedures is provided by Giovanni et al. (2005).

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Statistical Assistance for Programme Selection – For a Better Targeting of Active Labour Market Policies in Switzerland

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Michael Lechner*

Introduction

Struggling with increasing unemployment rates, many European countries intensified the role of active labour market policies (ALMP) in the 1990s. Active labour market programmes include training programmes such as job search and personality courses, computer courses, language courses and further vocational training. They also contain temporary wage and employment subsidies for competitive and for non-competitive (extraordinary) jobs. The latter are often referred to as job creation schemes or employment programmes, whereas the former may be in the form of subsidies for temporary jobs (interim jobs) or subsidies for jobs intended to become long-term (job introduction allowances). Other forms of subsidies and incentives for raising mobility also exist. These measures were introduced to reduce unemployment by providing and maintaining skills of job seekers, by improving job matching between employers and employees and by serving as a signalling device for job seekers or a screening device for firms. When assigned by the case worker, participation in programmes is often mandatory.

In this article, we argue that an inefficient allocation of job seekers into programmes could be one of the reasons why ALMPs were not as successful in reducing unemployment as their proponents had expected. We mention evaluation studies for Switzerland, such as Gerfin and Lechner (2002), and Gerfin, Lechner and Steiger (2005), which cast some doubts on the effectiveness of Swiss ALMP. These studies suggest that programmes have different effects for different groups of job seekers; in particular some individuals seem to gain from a programme, while others are harmed by it. We review the evidence of a simulation study (Frölich, Lechner and Steiger 2003, Lechner and Smith 2006), which indicated that overall employment rates could have been increased by a better assignment of people into programmes.

In order to examine whether the reintegration of the unemployed could indeed be increased through better targeting, a field study was initiated by the Swiss State Secretariat for Economic Affairs (seco) and conducted in 2005 by the Swiss Institute for International and Applied Economics of the University of St.Gallen (SIAW-HSG). Case workers were provided with individual predictions on a job seeker's employment chances when participating in a particular programme to assist them in selecting appropriate measures. We describe the implementation of the pilot study, whose objective is to evaluate whether statistically assisted programme selection (SAPS) could improve the allocation of unemployed to labour market programmes.

High unemployment despite ALMPs

Many European countries introduced active labour market policies during the 1990s. Their main purpose, as laid down by law, is to reintegrate the unemployed into the regular labour market. Some active labour market programmes are also designed to support disadvantaged groups, individuals with low earnings or to alleviate social imbalances. However, since the reintegration is the primary purpose of ALMP, we are interested in whether they reached their aims. Many European countries spend a considerable amount on training and employment programmes, as can be seen in Figure 1. Germany's public expenditures on ALMP amounted to 1.14 percentage points of its GDP in 2003, while Switzerland spent 0.77 percentage points of its GDP.

Despite the considerable spending on ALMP, many countries are still plagued with high and persistent unemployment. Standardised unemployment rates for some OECD countries are depicted in Figure 2. Compared to the situation in Germany, with an official unemployment rate of 11.7 percent, unemployment in Switzerland with a rate of 3.8 percent in 2005

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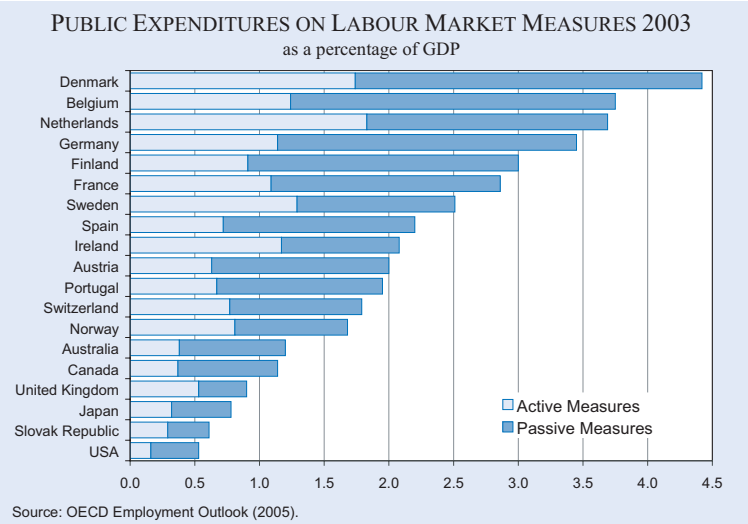
Figure 1



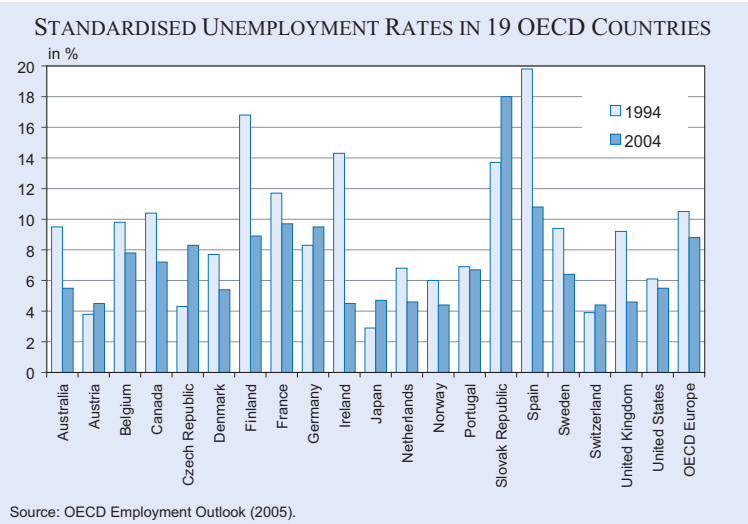
Source: OECD Employment Outlook (2005).

may appear modest at first sight. Nevertheless, unemployment is the main concern even for Swiss citizens according to a Credit Suisse survey (Credit Suisse Bulletin 2005). Since expenditures on ALMP as well as unemployment rates remain high, the evaluation of ALMP has become an important issue for policymakers.

How to evaluate ALMP

Obviously, it is not possible to deduce from ongoing high unemployment rates that ALMP has failed since we do not know how high unemployment rates would have been without ALMPs. To assess the success of an active labour market programme, one should not consider subsequent employment to be necessarily a result of previous programme participation. Suppose there is a highly skilled young unemployed individual who is assigned to participate in a full-time computer course. After four months this person finds a job. If, however, he had not attended the time-consuming computer classes, he might have found a job after two months since he could have spent more time and effort on job-search. Thus, in order to determine the effect of a programme, one should compare, for all different available programmes, the hypothetical employment situation that would ensue when participating in this programme. This should also include the option of not participating in any programme at time t, which may be called the "no-programme" option. This comparison is complicated by the fact that it is possible to observe the employment state only after participation and only for the programme actually chosen. In other words, when job seekers attend a language course, their potential employment state is unobservable if they, e.g., had participated in an employment programme instead. We cannot simply compare the labour market outcomes of individuals attending languages courses with those assigned to employment programmes as it is likely that people in the different schemes differ with respect to their characteristics. If there are, for example, highly skilled job seekers in programme A and poorly skilled in programme B, the first group will have higher employment chances even without participating in programme A. With microeconometric techniques it is possible to overcome the selection bias that arises if participants in programmes A and B differ systematically in characteristics that are relevant for labour market outcomes.

Figure 2



Source: OECD Employment Outlook (2005).

One possible technique is based on the idea that we want to compare the employment state of an individual in programme A with that of a *similar* individual in programme B, where *similar* means that the two individuals should be identical with respect to all characteristics that

matter for their employability as well as their selection into programmes. Conditional on all these characteristics, there is no selection bias. Therefore, conditional on these characteristics, the labour market outcomes of participants in programme A and programme B can be compared to judge the impact of programme A versus B. Such an estimation technique, however, is only applicable if a very rich data set including all variables that affected both programme assignment and labour market outcomes is available.

International experience with profiling and targeting systems

In principle, there are two very different systems for allocating job seekers to programmes by statistical means: targeting and profiling. A targeting system predicts, for specific individuals, their potential labour market outcomes for *every* available programme, including the no-programme option. The case worker can then choose the programme that maximizes the expected outcome. In contrast, a profiling system computes only a single risk factor for each individual, usually the probability of becoming long-term unemployed, and allocates job seekers to programmes according to the estimated risk factor. This risk factor, or score, is supposed to reflect the needs for intensive assistance in order to get back to work.

Profiling systems have been applied, for example, in Australia, the US, and in Germany since 2005. The Australian Job Seeker Classification Instrument (JSCI) computes the risk of becoming long-term unemployed on the basis of 14 individual characteristics including gender, age and nationality. Only job seekers with a high risk are counselled immediately by their case managers, whereas low-risk job seekers are eligible to job search training only after a few months.

The Worker Profiling and Reemployment Service system (WPRS) in the US identifies individuals most likely to exhaust their benefits and entitles them to reemployment services, which include counselling, job search assistance and job placement. Referrals to training are not made on the basis of this profiling score, though.

In Germany the unemployed are segmented into four categories of clients: market clients, counselling- and activating clients, counselling- and promoting clients and looking-after clients.[1] The re-employment chances of the first and the last groups are not expected to be improved by participation in labour market programmes.

A *targeting* system, in contrast, estimates the potential outcomes for a particular individual for each available programme. Every individual can then be assigned to the programme with the best chances of success. Canada planned such a targeting system, the so-called Service and Outcome Measurement System (SOMS), but eventually did not implement it, mainly for two reasons: the data base created for its implementation was considered a violation of privacy rules, and case workers were afraid of being replaced. For the US, the Frontline Decision Support System (FDSS) is described in Eberts and O'Leary (2002). The first pilot phase started in 2002 in the state of Georgia. However, as pointed out by Eberts and Randall (2005) the FDSS was not in place long enough to undergo a rigorous evaluation, because the Georgia department of labour discontinued their support of the project for "several reasons". In Germany, the Treatment Effect and Prediction Project (Treffer) is at an experimental stage. The Swiss Statistical Assisted Programme Selection project (SAPS), which will be described further below, is the first pure targeting system that has been implemented and will undergo a full (experimental) evaluation of its impact in 2007.

Targeting matters for effectiveness of ALMP

Several microeconometric evaluation studies found treatment *effect heterogeneity* in that a particular programme seems to impact differently on different subgroups of the unemployed at different stages in their unemployment spell (see e.g. Gerfin and Lechner 2002, for Switzerland). Case workers are probably aware of this heterogeneity when assigning programmes, which is also evident in the different characteristics of participants in different services. For example, foreigners are more likely to be assigned to language courses whereas highly qualified unemployed individuals participate more often in computer courses. In a simulation study, however, Lechner and Smith (2006) concluded that case workers did about as well as a *random assignment* of clients to services, when success is measured in terms of predicted employment rates one year after the start of a pro-

[1] Markt-, Beratungskunde-Aktivieren, Beratungskunde-Fördern und Betreuungskunde in German.

gramme. Furthermore, if job seekers had been assigned to programmes according to the highest predicted outcomes, the post-programme employment rates could have been raised by nearly 8 percentage points under the same programme endowments or even by 14 percentage points in the absence of resource constraints. In other words, the employment of job seekers could have been improved by allocating them into different programmes, or at different times in their unemployment spell or not at all. Frölich, Lechner and Steiger (2003) provide further evidence that targeting towards employment does not seem to lead to a reduction in earnings among those who find a job, while it seems to increase the overall employment rate. When job seekers are assigned to programmes in a way to maximize the employment rates after 7, 12 or 17 months, respectively, the monthly earnings gains due to statistical targeting are estimated to be about 230, 220 and 190 CHF, respectively, per person.

The simulation studies indicate that higher overall employment rates could be achieved by statistical targeting. This does not imply that every individual would be better off with statistical targeting than with the discretion of the case workers, however. If policymakers are restricted by budget constraints such that the number of training slots is limited, statistical targeting could possibly result in a situation where some job seekers are made worse off since they might no longer gain access to training as the slots are taken by other job seekers with higher predicted impacts. At least in a world without resource constraints, statistical targeting should in principle improve every individual's employment chances.

Nevertheless, compared to a purely statistical assignment system, case workers have the advantage of knowing many more details about the particular job seeker as a result of their interviews and counselling. Some of these details are too individual to be incorporated into a statistical system. On the other hand, case workers have only limited possibilities for assessing the effectiveness of programmes for certain job seekers as they have counselled only a rather small number of job seekers with similar characteristics. Furthermore, they usually cannot observe labour market outcomes of their clients after deregistration from the unemployment office. If clients do not register again at the same office, case workers do not know whether they are employed or not or whether they have moved to another city. There is therefore scope for assisting the case workers' estimates of the effects of a programme by providing them with information on programme effects obtained from a larger population. When counselling the unemployed, they may find it helpful to know that other unemployed individuals with similar characteristics were employed on average for 10 months after participating in programme A, but only for two months if they had attended programme B. The basic idea is thus to combine case specific knowledge of the case workers with group specific knowledge processed by a statistical expert system.

Statistical assistance for programme selection

With the evaluation methods mentioned it is not only possible to find out that allocation was not optimal in the past but might also provide predictions about which measure would be best for a job seeker today and tomorrow. If we are able to identify ex ante which programme improves labour market outcomes for which subpopulation and when, we could achieve higher employment rates through a more efficient allocation.

A prediction has to deal with many more challenges compared to an ex-post evaluation of ALMP. Every estimate is necessarily based on data of past participants. Predictions only make sense if economic relationships do not change too much or only in a more or less predictable way. We might then be able to predict potential labour market outcomes for a job seeker participating in programme A or B only if other job seekers had already participated in it before. If a new programme C with different features is introduced, predictions are not possible or become less accurate.

A second challenge is that a lot of data that can be used to estimate the effects of the programmes for past participants may not be available for deriving predictions for a specific unemployed individual due to administrative or data security reasons. The approach described below is based on first using all available data on past participants to estimate impacts free of selection bias, which are then averaged with respect to all the variables not available for the current specific client.

Statistically Assisted Programme Selection (SAPS) – the pilot study in Switzerland

The Swiss unemployment insurance system was completely revised in 1996, making ALMP a first priority.

Evaluations of Swiss active labour market programmes in Gerfin and Lechner (2002) and Gerfin, Lechner and Steiger (2005) found negative employment effects for some programmes and positive effects for others. The simulation studies by Frölich, Lechner and Steiger (2003) and Lechner and Smith (2006) found that case workers did not appear to be very effective in selecting the most appropriate programmes in order to maximize reintegration of the unemployed. Furthermore, they found evidence that statistically assisted targeting could achieve considerable improvement. Based on these studies the Swiss State Secretariat for Economic Affairs (seco) initiated a pilot study on statistically assisted programme selection (SAPS), which took place from May 2005 to December 2005 in 21 regional employment offices in five different regions (Basel, Berne, Geneva, St. Gallen and Zurich). About 150 randomly selected case workers were provided with predictions on potential labour market outcomes for their clients. About another 150 case workers, in the same office, constitute the control group to evaluate the impact of the system.

The predictions are based on two types of datasets. The first is a very rich data set drawn from previous job seekers, obtained from the unemployment insurance system and merged with the pension database, which is used for estimating the causal effect of programmes. The second data set contains information on current job seekers from the unemployment insurance database. The variables contained in this data set for the current clients are a strict subset of those available for the past job seekers since the information from the pension system is not accessible as they would be available only with a substantial delay.

The first data set includes all 460,442 job seekers who were registered at an employment office between 2001 and 2003; information from the unemployment insurance information system (AVAM/ASAL) is available up to December 2004. This data has been combined with information from the social security records (AHV) for January 1990 to December 2002. These combined data sources contain very detailed information on registration and de-registration of unemployment, benefit payments, sanctions, participation in ALMP, ten-year employment histories with monthly information on earnings and employment status and numerous socioeconomic characteristics such as qualification, education, language skills, job position, experience, profession, industry and an employability rating provided by the case worker. Given these very detailed data on labour market histories and current skills, it appears reasonable to assume that by conditioning on these characteristics selection bias can be avoided.

The second data set for all the new job seekers is updated every two weeks, with the latest information from the unemployment insurance data system. A new semiparametric methodology was developed (Frölich 2006) to combine the information from the first dataset, with the larger set of regressors available, in a way to derive predictions that only depend on the regressors available in the second data set.

In the current implementation of the SAPS system, employment outcomes are predicted as the expected number of months in stable employment within the following *twelve* months. The choice of this short-term measure was motivated by the official goals of the federal unemployment system and also for being able to evaluate the impact of SAPS within a reasonable time frame. An employment spell is considered stable if it lasts for at least three months without a break. If an individual finds a job that lasts only for a few weeks, this is not considered a positive outcome since avoidance of unstable jobs and frequent re-registration of unemployment is also one of the official goals. This definition of the outcome variable favours fast re-employment and penalizes short employment spells.

A variety of programmes are available in Switzerland, with the official classification distinguishing 43 different types. These were grouped into broader categories of 6 or 7 programmes, depending on the region. One programme category ("no programme") is to not participate in the programme today, but to leave the option for later. Other categories include job search and personality courses, language skills training, computer skills training, further training and employment programmes or job creation schemes in a sheltered labour market. There are several reasons for not choosing narrow categories. If too many different programmes were to be distinguished, the number of past participants observed in the data would be small for some courses and statistical precision would suffer. Furthermore, case workers also have better information to help them choose the specific course out of a broader category, e.g. whether an intermediate or advanced English course would be more appropriate. In addition, employment predictions made for the years 2005 and 2006

Predictions of employment outcomes for a particular job seeker

Category of active labour market programme	Months of stable employment
Computer skills training	5.9 (green)
No programme	3.5
Language skills training	2.7
Further vocational training	2.3
Job search and personality course	2.0
Employment programme	1.8 (red)

Source: SAPS (see Figure 3).

are based on participants for the years 2001 to 2003. Some courses may have been modified or providers may have changed. Thus narrow categories would be inappropriate as specific courses might no longer exist. On the other hand, the broader structure of the programmes remained largely unchanged.

The case workers participating in the pilot study were able to retrieve the predictions on-line via the internet, having access only to the predictions for their respective clients. After entering the job seekers' identification number, e.g. before or during an interview, the predictions are shown on the screen for this particular job seeker for the different programmes. In addition to these predictions, their statistical precision is also indicated. An example of these predictions is shown in the Table and an exemplary screenshot is given in Figure 3.

For this specific job seeker a computer course is recommended, and an expected 5.9 months of stable employment, during the next 12 months, are then predicted. On the other hand, if a language course is attended, only 2.7 months of stable employment are predicted. If not attending any programme now, about 3.5 months of employment are predicted. The statistical precision of the predictions is conveyed to the case worker through the shading of the numbers in *green, black* and *red*. The prediction that is shaded green has the highest precision. In other words, if only one of the options is shaded green, this is likely to be the best programme. If several options are shaded green, this indicates that the predictions were less precise and that the single best programme cannot be determined with high statistical confidence. Nevertheless, the set of all programmes shaded green is likely to contain the best programme. This illustrates the concept of statistical precision in an intuitive way. If all (or almost all) programmes appear in green, the statistical information contained in the data base is not very precise or specific to give useful recommendations. On the other hand, if two programmes appear in green, the case worker should choose one of them. And in the case of a single green programme, this would be the best option to follow. Programmes shaded in red, on the other hand, appear to be worse options in some statistical sense.

Figure 3

The case workers participating in the pilot project were encouraged to choose among the green-shaded programmes, including the no-programme option; nevertheless the case workers retained full discretion in choosing the type and timing of programmes. Case workers often have additional information on their clients that is not contained in the available data set. The case worker may know about psychological and physical problems or illnesses or other impediments. The case workers were therefore asked to combine their personal assessments and beliefs with the predicted employment outcomes of the SAPS system and to provide feedback justifying their decision.

The case workers were encouraged to retrieve the predictions before or during every interview since the predicted outcomes may change over time as they take elapsed unemployment duration and other time-varying covariates into account. The system also takes the optimal timing for a programme into consideration. For example, it can be optimal to assign no programme in the beginning of an unemployment spell but to assign a programme if the client has not found a job after four months.

Evaluating statistical assisted programme selection

The pilot study is designed as a social experiment. It is comparable with a randomized (non-blinded) medical study, in which one half of the patients receives a new drug and the other half the placebo. After some time both groups are compared to see whether one group is significantly healthier than the other. The participating case workers for the field study were randomly selected in order to avoid any selection bias which could occur, for example, if only highly motivated or highly qualified case workers participated. In each employment office, about 50 percent of the case workers were selected, with the other 50 percent representing the control group. Twelve months after the end of the field study, the employment careers of the job seekers will be followed up. Their employment state will be compared with the labour market outcomes of those job seekers whose case workers were not assisted by statistical information. In this manner it can be evaluated whether statistically assisted programme selection (SAPS) improved the allocation of active labour market programmes. The first results are expected in 2007.

Concluding remarks

Recent evaluation studies have suggested that the overall effectiveness of active labour market policies in Switzerland might have been suboptimal and could perhaps be increased by improving the process of allocation of job seekers to programmes. A statistical targeting system might help to do so by providing case workers with individualized predictions about which programme, including the no-programme option, is likely to be best for this individual.

Several studies have indicated the existence of effect heterogeneity with respect to programmes and demographic groups not only for Switzerland, but also for other countries, see for instance Caliendo, Hujer and Thomsen (2005) or Lechner, Miquel and Wunsch (2004) for Germany or the review by Heckman, Smith and Clement (1997).

There is also mounting empirical evidence that the employment rate presumably could have been higher if job seekers had been assigned to programmes in a different way. For Switzerland, the studies by Frölich, Lechner and Steiger (2003) and Lechner and Smith (2006) were referred to. For Germany, Lechner, Miquel and Wunsch (2004) find that if the unemployed had been assigned to re-training instead to other programmes they would have been more likely to be employed.

These findings triggered the development of a statistical targeting system (Statistically assisted programme selection, SAPS) that was implemented in a pilot study in Switzerland in 2005 and will be evaluated in 2007. Due to the setup as a randomized field experiment, its evaluation will provide important insights (not only for Switzerland) on statistical targeting in practice, and how it might be further improved.

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Union Density

Union density in the following is defined as the ratio of union membership (employed wage and salary earners only) and civilian employment of wage and salary earners. The Table presents data on union density for 1970, 1980, 1990 and 2000–03 in 24 OECD countries. Union density rates in 2003 were lower than in 1970 in all but four small European economies (Finland, Sweden, Denmark and Belgium). These four happen to be the only ones in which unions are involved in the administration and execution of unemployment insurance. Also, each decade became progressively worse from the perspective of union organizing (except in Spain where the unions, facing a difficult start after the fall of the Franco dictatorship, managed to acquire organizing rights and succeeded in building a reasonably loyal membership base among permanent workers in large firms). Thus, even in countries in which unions made strong membership gains in the 1990s, as was the case in Ireland or the Netherlands, the rapid growth of employment led to a drop in the union share of wage and salary employment. Elsewhere in Europe – for instance, in Germany, France, or Austria – union density fell in spite of extremely slow employment growth.

The density statistics in the Table show a very large degree of variation – from very low rates in France, Korea, the United States, Poland and Spain to very high rates in Sweden, Finland and Denmark, closely followed by Belgium and Norway. Union density is twice as high in the European Union as in the United States, but trends are similarly downward and may be expected to converge somewhat when current membership trends in the largest European economy (Germany) and the largest of the new member states in Central and Eastern Europe (Poland) continue. Also, current levels of unionisation in Switzerland, New Zealand, the Netherlands, Germany and Australia – with just more than one-fifth of the employed wage-earning population joining a union – are located at the lower end of the spectrum.

W.O.

Reference

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Union density in OECD countries, adjusted data, 1970–2003, in percent

	1970	1980	1990	2000	2001	2002	2003
Austria	62.8	56.7	46.9	36.5	35.7	35.4	n.a.
Belgium	42.1	54.1	53.9	55.6	n.a.	55.4	n.a.
Czech Republic	n.a.	n.a.	78.8	n.a.	27.0	n.a.	n.a.
Denmark	60.3	78.6	75.3	73.3	72.5	n.a.	70.4
Finland	51.3	69.4	72.5	75.0	74.5	74.8	74.1
France	21.7	18.3	10.1	8.2	8.1	8.3	8.3
Germany	32.0	34.9	31.2	25.0	23.5	23.2	22.6
Hungary	n.a.	n.a.	n.a.	n.a.	19.9	n.a.	n.a.
Ireland	53.2	57.1	51.1	n.a.	36.6	36.3	35.3
Italy	37.0	49.6	38.8	34.9	34.8	34.0	33.7
Netherlands	36.5	34.8	24.3	23.1	22.5	22.4	22.3
Norway	56.8	58.3	58.5	53.7	52.8	53.0	53.3
Poland	n.a.	n.a.	53.1[a]	14.7	n.a.	n.a.	n.a.
Slovak Republic	n.a.	n.a.	78.7	n.a.	36.1	n.a.	n.a.
Spain	n.a.	12.9	12.5	16.1	16.1	16.2	16.3
Sweden	67.7	78.0	80.8	79.1	78.0	78.0	78.0
Switzerland	28.9	31.1	24.3	19.4	17.8	n.a.	n.a.
United Kingdom	44.8	50.7	39.3	29.7	29.3	29.2	29.3
Australia	50.2[b]	49.5[c]	40.5	24.7	24.5	23.1	22.9
Canada	31.6	34.7[d]	32.9	28.1	28.2	28.2	28.4
Japan	35.1	31.1	25.4	21.5	20.9	20.3	19.7
New Zealand	55.2[e]	69.1	51.0	22.7	22.6	22.1	n.a.
Republic of Korea	12.6	14.7	17.6	11.1	11.2	11.1	11.2
United States	23.5[f]	19.5[g]	15.5	12.8	12.8	12.6	12.4

[a] 1989. – [b] 1976. – [c] 1982. – [d] 1984. – [e] 1971 – [f] 1973. – [g] 1983.

Source: Visser (2006).

Fiscal Consolidation Efforts in Ten New EU Member States

In a recent paper, Jan Zápal and Ondreij Schneider (2006) analyse the fiscal consolidation efforts of the ten new EU member states[1] that joined the EU in May 2005. In principle, the new members are expected to fulfil the provisions of the Stability and Growth Pact of 1997 (revised in 2005), i.e. to adhere to the 3 percent public deficit and the 60 percent public debt rule. However, six of the ten new EU members were put under the Excessive Deficit Procedure immediately after they entered the EU because of violations of the established fiscal rules.

The authors do not simply describe the fiscal stance of the countries and its development over time; rather they create a system of measurement that allows a closer look at those – mainly political – factors that are responsible for the resulting fiscal deficit and debt. They distinguish fourteen relevant factors to which scores (points) are assigned.

Pension: Is there a three-pillar pension system and is the first pillar ruled by the defined contribution principle?

Health: Has there been "considerable" health-care reform?

Excessive Deficit Procedure: Has the country respected the rules of the Stability and Growth Pact since accession (and, thus, is not and has not been under the named procedure)?

Revision: What is the average size of revisions of the public deficit in consecutive Pre-Accession Economic Programmes and Convergence Programmes? The lower, the better.

Speed: Has the size of fiscal consolidations, as outlined in consecutive Pre-Accession Economic Programmes and Convergence Programmes, increased or decreased? A decrease is better.

Dependency: What is the size of the demographic dependency ratio? The lower, the better.

Fertility: What is the size of the fertility rate? The higher, the better.

Benchmark: Is the average factual primary deficit in period 2000 through 2004 higher or lower than the benchmark primary deficit (the latter being that deficit which leads to a constant public debt ratio)? Lower is better.

Sustainability gap: This gap is measured by the difference between benchmark and factual deficit. The lower, the better.

Stabilising function: Has the number of years with anti-cyclical fiscal policy been larger or smaller than the number of years with pro-cyclical policy? The larger, the better.

[1] Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia and Slovakia.

Table 1

Scores for variables influencing the fiscal stance in the ten new EU member states

	Pension	Health	EDP	Revision	Speed	Dependency	Fertility	Benchmarking	Sustainability gap	Stabilizing function	Fiscal stance	Room to manoeuvre	Consolidations	Ability to manoeuvre	**Sum**	**Rank**
No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
Cyprus	0	1	0	0.2	0.8	2.0	2.0	1	1.6	1.2	0.4	1.4	1.0	0.4	**13.0**	**5**
Czech Rep.	0	0	0	0.4	0.6	1.2	0.2	0	0.2	1.2	0.4	1.0	0.2	2.0	**7.4**	**10**
Estonia	1	1	1	2.0	1.8	0.2	1.6	1	2.0	1.2	1.2	1.6	1.6	1.6	**18.8**	**1**
Latvia	2	1	1	1.4	1.6	0.4	0.8	0	1.0	1.2	1.2	1.8	0.2	1.4	**15.0**	**3**
Lithuania	1	1	1	1.6	1.0	0.8	0.8	0	1.2	0.8	0.4	2.0	1.6	1.0	**14.2**	**4**
Hungary	1	0	0	0.6	1.4	0.6	1.4	1	1.8	0.2	0.4	0.6	0.6	1.2	**10.8**	**8**
Malta	0	1	0	0.8	0.2	1.4	1.8	0	0.4	0.8	1.6	0.8	1.6	0.2	**10.6**	**9**
Poland	2	1	0	1.8	0.4	1.6	0.8	0	0.8	1.2	0.2	0.4	0.6	0.6	**11.4**	**7**
Slovenia	1	1	1	1.0	1.2	1.0	0.6	0	1.4	0.4	1.6	0.2	1.0	0.8	**12.2**	**6**
Slovakia	2	1	0	1.2	2.0	1.8	0.4	0	0.6	0.4	2.0	1.2	1.0	1.8	**15.4**	**2**

Note: The higher the score, the better the policy.

Source: Zápal and Schneider (2006).

Table 2

Scores of indexes composed of a selection of the variables in Table 1

	Reform efforts	Rank	Ageing impact	Rank	Fiscal functions	Rank	Past behaviour	Rank
Cyprus	2.4	8	9.4	2	2.6	6 –7	6.2	6
Czech Rep.	0.6	10	4.6	10	1.8	9	3.0	10
Estonia	4.8	2	10.0	1	4.0	1 – 2	11.8	1
Latvia	4.4	4	8.4	4	2.6	6 – 7	7.6	2 – 4
Lithuania	4.0	6	7.8	5	2.8	5	7.6	2 – 4
Hungary	2.0	9	7.6	6	1.2	10	6.0	7
Malta	4.2	5	5.6	9	4.0	1 – 2	5.4	8
Poland	3.8	7	7.2	7	2.0	8	5.0	9
Slovenia	4.6	3	6.0	8	3.0	4	7.6	2 – 4
Slovakia	6.0	1	8.8	3	3.4	3	7.2	5

Note: The higher the score, the better the policy.

Source: Zápal and Schneider (2006).

Fiscal stance: Has the number of years with restrictive fiscal policy been larger or smaller than the number of years with expansionary policy? The larger, the better.
Room to manoeuvre: General government revenues as a percentage of GDP: The lower, the better.
Consolidations: Has the number of successful consolidations been larger or smaller than the number of unsuccessful consolidations? The larger, the better.
Ability to manoeuvre: What is the share of open-ended expenditure in total government expenditure? The higher, the better.

Table 1 contains the scores assigned by the authors. A ranking according to the simple sum of the scores supports one of the main findings of the study, namely that two groups of countries can be distinguished: one with successful reforms and fiscal consolidations, the other with much less success. The former group consists of Estonia (far ahead), Slovakia, Latvia and Lithuania, while the other group consists of Poland, Hungary, Malta, and, far behind, the Czech Republic.

On the basis of these scores the authors have constructed four indexes from the fourteen variables. These indexes are intended to measure the reform efforts, the impact of ageing, the quality of fiscal policy in terms of stabilisation (including a stable economic environment) and in terms of the criteria of the Stability and Growth Pact. Each of the four indexes is composed of a selection from the fourteen variables (Table 2).

The four indexes of Table 2 shed some additional light on the question of why some countries are ranked higher or lower than one might have expected. Cyprus, for instance, having been put under the Excessive Deficit Procedure since accession, ranks relatively high (rank 5) in the summary ranking of Table 1. This seems to be mainly the result of high scores for *Dependency* and *Fertility* (Table 1), which do not represent any policy effort. The more complex index *Ageing impact* in Table 2, by contrast, is composed of 8 of the 14 variables and indeed contains variables that indicate reform effort.

R.O.

Reference

Zápal, J. and O. Schneider (2006), "What are their Words Worth? Political Plans and Economic Pains of Fiscal Consolidations in the New EU Member States", *CESifo Working Paper* no. 1655.

Personal Income Taxes, Social Security Contributions and Part-time Work

Provisions for part-time work in the personal income tax system, social security contributions and/or case benefits are seldom. The Table shows that 19 out of 27 OECD countries have no special provisions for part-time work.

Very few countries have tax provisions that depend on the number of hours worked. In Belgium the earned income tax credit does not apply for someone working less than 1/3 of normal weekly hours. In France the earned income tax credit is adjusted in the case of part-time work. In the UK the Working

Special hours-based tax, social security contributions and benefit provisions, 2003

	Personal income tax	Social security contributions	Cash benefits
Australia	No	No	Newstart Allowance is only applicable for someone working under 35 hours and who is seeking full-time employment.
Belgium	The earned income tax credit does not apply for someone working less than 1/3 of normal weekly hours.	The reductions in social security contributions are based on the full-time equivalent wage and then reduced in proportion to hours worked.	No
Denmark	No	The fixed supplementary pension contribution is paid if the number of hours is at least 75% of normal hours. The rates are 2/3 of those for between 50 and 75%; 1/3 for between 25%–50% and 0 for below 25%. The fixed "unemployment contribution" may also be reduced to 2/3, if the number of hours is less than 75% of normal hours. However, employees normally choose to pay the full amount to retain the right to full unemployment benefits.	No
France	The earned income tax credit (prime pour l'emploi) is adjusted in the case of part-time work.	The reductions in the employer SSC are adjusted in the case of part-time work. The effective ceiling for SSC and unemployment insurance is adjusted in the case of part-time work.	No
Italy	No	No	The family allowance is fully paid if the number of weekly hours is above 24, if below, it is based on the number of days in employment.
Spain	No	The lower and upper ceilings for employee SSC are proportional to the actual number of hours worked.	No
Turkey	No	There is a daily min. and max. wage threshold for employee and employer SSC, based on a working day of 7.5 hours.	No
United Kingdom	The Working Tax Credit for families where there is a person who works at least 30 hours a week. Families with children and people with a disability may claim this when working at least 16 hours a week. This is a non-wastable tax credit.	No	No
Note: Australia, Canada, Czech Republic, Finland, Germany, Hungary, Iceland, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Sweden and the United States have no special provisions for part-time work.			

Source: OECD, Taxing Wages 2004/2005, Paris, 39.

Tax Credit is based on family members working at least 30 hours a week (16 hours for families with children).

In some countries (Belgium, Denmark, France, Spain and Turkey) the Social Security Contributions (SSC) are adjusted for part-time work. In Belgium the reductions in the SSC are related to hours worked in such a way that, for example, someone working half time will only get half of the reduction computed on the basis of the (theoretical) wage if working full time. In Denmark the fixed supplementary pension contribution is paid if the number of hours is at least 75 percent of normal hours. The rates are 2/3 of those for between 50 and 75 percent, 1/3 for those between 25 percent and 50 percent and 0 for those working below 25 percent of normal hours. The fixed unemployment contribution may also be reduced to 2/3 if the number of hours is less than 75 percent of normal hours. However, employees normally choose to pay the full amount to retain the right to full unemployment benefits. In France, Spain and Turkey there are special provisions regarding thresholds and lower and upper limits for SSC.

In some countries like Australia (Newstart allowance) and Italy (family allowance) some cash benefits can depend on the number of hours worked.

W.O.

Reference

OECD, *Taxing Wages* 2004/2005, Paris.

Remaining Central Government Enterprise Portfolios in Europe

Through massive privatizations European governments have raised about €700 billion since 1977. The question is now: how much is left and in which sectors? In a recent analysis for the *Privatization Barometer* (January 2006), Farinola and Megginson have addressed this problem.

Figure 1 shows the remaining value of the direct and indirect stakes in enterprises that central governments still held in 2005. France leads the list with a portfolio value of nearly €120 billion, followed by Italy with €42.5 billion, while Hungary, Luxembourg, Denmark and Slovenia are at the end of the ranking.

Some clarifying remarks about the meaning of the figures reported in Figure 1 are in order. The information provided relates to 17 EU member countries. The UK and Ireland are the only EU countries where the central government does not hold any stakes in enterprises. The portfolio values of the remaining countries are not reported. Indirect government ownership is executed primarily through financial institutions like the German *Kreditanstalt für Wiederaufbau* (KfW) or the French *Caisse des Depots et Consignations* (CDC), which are the direct holders. Indirect ownership is most strongly pronounced in Germany where it is about 70 percent of the total portfolio while the indirect share in most other countries is much lower.

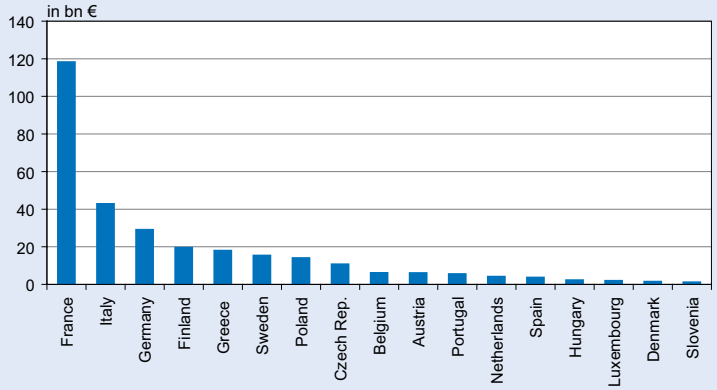
The information in Figure 1 relates only to what the *central* government owns. This may lead, specifically for federal states like Germany, to a considerable underestimation of total government-owned enterprise portfolios by not including what is held by lower government levels. Finally, only the portfolio values of *listed companies* are reported. Thus, the figures do not contain wholly government-owned enterprises or infrastructure, such as ports, airports, electricity networks, railroads and roads.

In Figure 2, the portfolio values are related to GDP. This list is led by Finland, followed by the Czech Republic and Greece, while France is only ranked fourth. Luxembourg, lower in absolute values, ranks relatively high (six) in terms of GDP. By contrast, Germany is third in absolute values, but ranks low in relation to GDP.

How are the enterprise portfolios of governments distributed over the sectors? As the Table shows, the bulk of portfolios is invested in three sectors: utilities, telecommunications, and oil and gas. These three

Figure 1

Remaining (not yet privatized) Central Government Portfolio Value



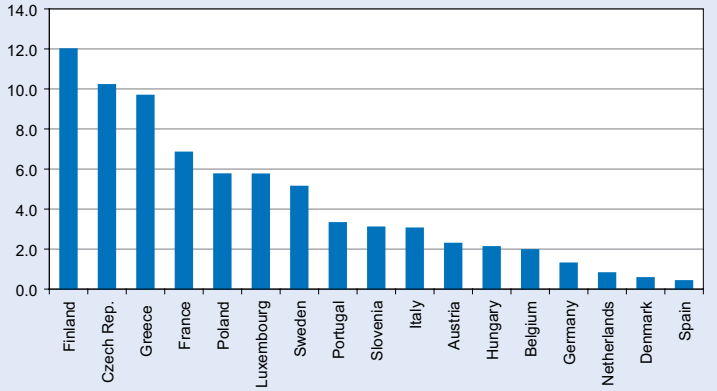
Note: The figure measures the combined value of direct and indirect stakes.

Source: L. Farinola, W. L. Megginson, 2006.

Figure 2

Remaining Central Government Portfolio Value

in % of GDP



Note: The figure relates to the sum of direct and indirect stakes.

Source: L. Farinola, W. L. Megginson, 2006; and own calculations.

Government portfolio value by sector, EU-25, 2005

Sector	Total portfolio value in € bn
Utilities	84.7
Telecommunications	67.2
Oil, Gas	67.0
Banking, finance, insurance	29.7
Manufacturing and other industries	16.0
Aerospace, defence	14.0
Transportation industry	11.4
Trade and services	3.6
Sum	**293.6**

Source: Farinola, L. and W. L. Megginson 2006.

sectors together amount to about 75 percent of the total. The high remaining amount of telecommunications portfolio is all the more astonishing because it is this sector which has made up the single largest share of total privatisation revenues in the past.

The number of listed (private or privatised) enterprises with remaining government stakes adds up to 123 in the EU-25 countries. It may be doubtful that European governments are prepared to continue with privatisation as they did in the 1980s and 1990s. If the remaining stakes in listed companies are difficult to touch for political reasons, this will be all the more so for unlisted firms and assets in the hands of not only the central but also the regional and local governments.

R.O.

Reference

Farinola, L. and W. L. Megginson (2006), "Leviathan as Shareholder: the Value of Governments' Stakes", *The Privatization Barometer Newsletter,* issue no. 4, 25–30.

Students' Dependency on their Parents

Students in western Europe tend to wait longer to start a family. It is presumed that one of the reasons for this is dependency on their parents. The degree of dependency differs considerably among countries. These differences depend on the role society has given to students and who the state has entrusted with the task of financing the students.

In southern and western Europe and Ireland, students do not comprise an independent social group. Instead they are seen as part of the family. Parents are financially responsible for their children until they begin working. This idea is based on a principle of subsidiarity according to which the parents' financial responsibility for the support of their children as students takes precedence over that of the state. In this case state child benefits (see Table) are still granted and distributed to the parents, who use them for the financial support of their children. Only a small portion of students are given scholarships from the state, and the amount the students receive is not very high. Whether a student qualifies for a scholarship and how much he receives is dependent on the income of the parents. Whether a student lives at home or not does not affect the amount of the scholarship. Financing studies by taking out a loan is not usually done.

To a certain degree France has a special position within this group of countries. Here, too, the parents are responsible for the support of their children during their studies. When students decide to have children, however, the state provides direct support to the students. The scholarships are then increased. Students also receive an interest-free loan to start their own households, which is to be paid back only in part if a child is born. The French system is based on a different idea of growing up than in other countries of southern and western Europe. While in the latter group of countries the professional independence is the criterion for independent adulthood, in France having a child is seen as the criterion for independence and severance from parental care. Like France, the Netherlands also has a slightly different position. As the financing of students is financed there partially by the parents and partially by the state, it falls somewhere between the model of southern and western Europe and that of Scandinavia.

Although in the Scandinavian countries students are seen as an independent social group, they are not responsible for the financing of their studies. This is the task of the state. The parents of the students do not receive child benefits from the state. A large portion of the students receive substantial state scholarships. Qualification for and the amount of the scholarship are independent of the parents' income. Students who no longer live with their parents are usually given special support. In Norway and Sweden student loans are available.

The Anglo-Saxon countries (here: the United Kingdom) also see students as an independent social group. In contrast to the Scandinavian countries, however, the students themselves are responsible for the financing of their studies. The parents receive no child benefits from the state. Scholarships are only available to a limited degree, but 40 percent of the students receive loans. These can be as much as €595.00 per month.

W.O.

Reference

Ochel, W. (2005), "Familiengründung trotz Studium", *ifo Schnelldienst* 59 (4), 7–11.

Financial support of students[a)]

	Financing of studies	Parents' entitlement to child benefits from the state
Southern and western Europe		
Greece	Task of the parents; scholarships for 1% of students; entitlement dependent on parents' income	For students up to 22 years of age
Italy	Task of the parents; scholarships for gifted students (=7% of students); up to EUR 342 per month; entitlement dependent on income of parents	Up to 18 years of age
Portugal	Task of the parents; scholarships up to EUR 617 per month; amount dependent on income of the parents and on whether students live at home	Up to 24 years of age
Spain	Task of the parents; scholarship for 23% of students; up to EUR 348 per month; entitlement dependent on student's success in their studies and income of parents.	Up to 18 years of age
Austria	Tasks of the parents; scholarships for 17% of students; up to EUR 606 per month; dependent on parents' income	For students up to 26 years of age
Switzerland	Task of the parents; scholarships for 15% of students; in the city of Basel, for example, up to EUR 602 per month; dependent on parents' income	For students up to 25 years of age
Germany	Task of the parents; scholarships for 22% of students; up to EUR 292 per month (in addition to loans); dependent on income of parents	For students up to 27 years of age
Belgium (Flanders)	Task of the parents; scholarships up to EUR 234 per month depending on students living situation, number of siblings and income of parents	For students up to age of 25
France	In principle task of the parents; scholarships for 25% of students; up to EUR 292 per month; dependent on number of siblings at school/university, distance to place of studies and income of parents. Amount of scholarship also dependent on number of own children	For families with two children up to 20 years of age and income of children under 55% of minimum wage
Netherlands	Task of the state and of parents; basic scholarship of EUR 233 per month independent of parents' income for those students not living with parents; additional EUR 233 per month dependent on income of parents' (in addition to loans)	Up to 17 years of age
Scandinavia		
Denmark	Task of the state; scholarships for 93% of students; up to EUR 478 per month; independent of parents' income	Up to 18 years of age
Finland	Task of the state; scholarships up to EUR 259 per month dependent on family status, age and living situation of students; in addition living allowance of up to EUR 172 per month; independent of parents' income	Up to 17 years of age
Norway	Task of the state; scholarships for 69% of students; up to EUR 372 per month; independent of parents' income; (additionally loan of EUR 557 per month). Students who live with their parents receive EUR 929 per month as a loan	Up to 18 years of age
Sweden	Task of the state; scholarships for 67% of the students; EUR 233 per month (as of 25 years of age EUR 533 per month); additionally loan of EUR 133 per month; independent of parents' income	For students up to 20 years of age
Anglo-Saxon countries		
Great Britain	Students responsible; scholarships only in limited number; 40% of students receive loans up to EUR 595 per month (75% basic entitlement, 25% dependent on income)	For students up to 19 years of age
Ireland	Task of the parents; scholarships for 36% of students; up to EUR 245 per month; dependent on parents' income	For students up to 19 years of age

[a)] 2003/2004.

Source: Compilation of Ifo Institute.

Government Debt Management in the Euro Area

Outstanding debt, be it debt of an enterprise, a private household, a government or a country as a whole, is characterised not only by total amount and coverage by assets, but also by maturity structure, time profile of interest payments, debt instruments used and risk, namely with respect to refinancing the due debt at higher interest rates. Influencing these characteristics in a reasonable and optimal way is the task of debt management. Debt management is not only undertaken when additional finance has to be raised or when old debt becomes due; it is an everyday activity that relates to the total stock of outstanding debt, the characteristics of which can be permanently changed through actions on the capital market.

While debt management in the private sector aims at minimising costs and risks, debt management in the public sector could – at least theoretically – additionally or alternatively pursue macroeconomic objectives, like macroeconomic stabilisation, tax burden smoothing or stabilisation of the public deficit. In practice, however, management of public debt in the euro area is aimed primarily at financing "the annual borrowing at the lowest possible (medium-term) cost with acceptable risks" (Wolswijk and de Haan 2005, 7).

In a recent contribution the above-mentioned authors study public debt management in the euro area countries: how it is organised and how the characteristics of public debt have changed under the influence of

Box

Government debt managers in the euro area

	Manager	Institutional position	Debt manager classification	Website
Austria	Österreichische Bundesfinanzierungsagentur	Part of the Ministry of Finance	SMO	www.oebfa.co.at
Belgium	Service de la dette publique/Federale Dienst van de Staatsschuld	Part of the Federal Public Service Finance	DMO	www.treasury.fgov.be/interdette
Finland	Valtiokonttori (State Treasury)	The State Treasury is supervised by the Ministry of Finance	DMO	www.valtionkonttori.fi/rahpa/bulletin/bulletin.htm
France	Agence France Trésor	Part of the Ministry of Economic Affairs, Finance and Industry	DMO	www.aft.gouv.fr
Germany	Bundesrepublik Deutschland – Finanzagentur GmbH	Limited company of the German State, represented by the Federal Ministry of Finance, as sole shareholder	SMO	www.deutsche-finanzagentur.de/eng/
Greece	General Accounting Office	Part of the Ministry of Economy and Finance	DMO	www.mof-glk.gr/en/home.htm
Ireland	National Treasury Management Agency	The chief executive is appointed by the Minister of Finance and is directly responsible to him	DMO	www.ntma.ie
Italy	Dipartimento del Tesoro	Part of the Ministry of Economy and Finance	DMO	www.tesori.it/publicdebt
Luxembourg	Trésorerie de l'Etat	Part of the Ministry of Finance	DMO	www.etat.lu/TS/
Netherlands	Agentschap van het Ministerie van Financiën	Part of the Ministry of Finance, but with much autonomy	DMO	www.dutchstate.nl
Portugal	Instituto de Gestão do Crédito Público	Part of the Ministry of Finance	SMO	www.igcp.pt
Spain	Tesoro Público	Part of the Ministry of Economy and Finance	DMO	www.mineco.es/tesoro/htm/deuda/index_en.htm

Source: Wolswijk and de Haan 2005; Currie et al. 2003.

debt management and increasingly integrated and competitive capital markets.

Principally, the task of public debt management could be either assigned to the national central bank (NCB) or to the Ministry of Finance (MoF). Concern for price stability and for a better control of the transmission channel of monetary policy may speak in favour of the NCB, while the pursuit of other macroeconomic goals and, in practice most important, minimization of interest costs for the budget make the MoF the adequate institution for supervising and/or conducting debt management operations.

The Box shows that none of the euro area countries has allocated public debt management to the respective NCB. In all countries it is the MoF that is responsible, albeit with important differences. Four of the twelve euro area countries have created a separate unit outside the MoF that the authors call "special debt management office" (SMO). It is to these units that operational responsibilities are delegated. In the other eight countries, operational tasks are kept within the MoF. The units of the MoF that conduct debt management operations are called "debt management office" (DMO). The institutional differences between SMO and DMO notwithstanding, in practice the difference may not be so striking. Even the countries with a DMO structure, like Belgium, France and the Netherlands, have granted more room for manoeuvring to their debt managers.

There may be several reasons why operational independence has been increased for debt management units. The project of the European Monetary Union (EMU) and later the real start of the EMU have led to a fast integration of European capital markets. This development has put debt managers – for public as well as for enterprise debt – under additional competitive pressure. Before the establishment of the EMU, public debt managers were dominant players in their national capital markets but not after the introduction of the euro when the notion of a "national capital market" became less meaningful.

Increased integration and competition in capital markets have also been furthered by new technical innovations such as systems for electronic securities trading. These developments require a higher degree of operational independence, more room to quickly react to market chances and more professionalism, all of which may be more easily accomplished outside a bureaucratic structure.

R.O.

References

Currie, E., J.-J. Dethier and E. Togo (2003), "Institutional Arrangements for Public Debt Management", *World Bank Policy Research Working Paper,* no. 3021.

Wolswijk, G. and J. de Haan (2005), "Government Debt Management in the Euro Area: Recent Theoretical Developments and Changes in Practice, *European Central Bank Occasional Paper Series,* no. 25.

New At DICE Database

In the second quarter of 2006 the DICE Database received about 60 new entries, consisting partly of updates of existing entries and partly of new topics. Some topics are mentioned below:

- Business Competitiveness Index
- Public Expenditures
- Public Revenues, Taxes
- Tax Burden of Families
- Labour Costs and Net Income
- Public Debt
- Public Employment
- Pensions: Retirement Age

Forthcoming Conferences

European Finance Association, 33rd Annual Meeting
Zurich, 23–26 August 2006

The topics of the meeting are: Asset prices, corporate finance, market efficiency and arbitrage pricing, market microstructure, hedge funds and active investing, term structure of interest rates/government bonds, debt and credit risk, options and derivates, financial history, behavioural finance, portfolio management/investments, banking/financial crises/regulation, international finance, emerging markets, mutual funds, real estate, risk, venture capital/private equity and IPOs, finance and the real economy.

European Economic Association, 21st Annual Congress
Vienna, 24–28 August 2006

The congress in Vienna will be a joint meeting of the European Economic Association and the European Econometric Society.

Scientific organisers: Jaume Ventura, Bruno Julien and Oliver Linton.

New Directions of Fiscal Federalism
Lexington, Kentucky, 14–16 September 2006

This conference is sponsored by the Institute of Federalism and Intergovernmental Relations (IFIR) and CESifo. The keynote speakers are Jean Hindriks, Robert Inman, Peter Birch Sorenson, Barry Weingast, John D. Wilson and George Zodrow.

Scientific organisers: David Wildasin and Thiess Büttner.

Verein für Sozialpolitik, Annual Congress 2006
Bayreuth, 26–29 September 2006

The main subject of the congress will be "Public Investment and Infrastructure under Tight Public Budgets". The Thünen Lecture will be given by Dennis Mueller.

American Economic Association, 2007 Annual Meeting
Chicago, 5–7 January 2007

The Center For Public Integrity

The Center for Public Integrity is a non-profit, non-partisan, tax-exempt organisation that conducts investigative research and reporting on public policy issues in the United States and around the world. The Center was founded in 1989 by Charles Lewis. It is located at Washington, DC.

Apart from reports and books the Center publishes the Public Integrity Index. This index is the centrepiece of the Global Integrity report, providing a quantitative scorecard of governance practices in each county. The Public Integrity Index assesses the institutions and practices that citizens can use to hold their governments accountable to the public interest. The Public Integrity Index does not measure corruption itself, but rather the opposite of corruption: the extent of citizens' ability to ensure their government is open and accountable.

DICE

Database for Institutional Comparisons in Europe

www.cesifo.de/DICE

The database DICE was created to stimulate the political and academic discussion on institutional and economic policy reforms. For this purpose, DICE provides country-comparative information on institutions, regulations and the conduct of economic policy.

To date, the following main topics are covered: Labour Market, Public Finances, Social Policy, Pensions, Health, Business Environment, Natural Environment, Capital Market and Education. Recently a chapter on Experts' Assessments of Governance Characteristics has been added. Information about Basic Macro Indicators is provided for the convenience of the user.

The information of the database comes mainly in the form of tables – with countries as the first column – but DICE contains also several graphs and short reports. In most tables, all 25 EU and some important non-EU countries are covered.

DICE consists primarily of information which is – in principle – also available elsewhere but often not easily attainable. We provide a very convenient access for the user, the presentation is systematic and the main focus is truly on institutions, regulations and economic policy conduct. Some tables are based on empirical institutional research by Ifo and CESifo colleagues as well as the DICE staff.

DICE is a free access database.

Critical remarks and recommendations are always welcome.
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