

# **Cross-Fertilisation Between the U.S. and European Telecommunications Regulation**

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# **Cross-Fertilization Between the U.S. and European Telecommunications Regulation**

*By Ingo Vogelsang*

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## **I. Introduction**

One of the most important tasks for a regulation economist is to help improve regulation. While theory can be a guidance and source of inspiration, the practical demonstration of new policies is generally more convincing. In order for this to happen, someone has to take the lead and implement genuinely new policies. Over most of the history of the telephone the U.S. was considered the leader in the telecommunications sector development, and, for the last few decades, it also became the leader in regulatory reform and liberalization of the sector. This certainly was the case in most areas of telecommunications. However, more recently, the U.S. has been losing some of its leadership role and has become a follower in areas, such as price cap regulation. In addition, according to Elixmann et al. (2001), the U.S. in 1999 only occupied a middle rank in terms of liberalization and competition compared to eight European countries. In this paper, I will try to characterize the recent era of cross-fertilization and draw some lessons for better policies. The analysis roughly covers the time after the watershed year 1984, when AT&T was divested in the U.S. and BT was privatized in the U.K.

Surprisingly little economic analysis seems to exist on cross-country learning of policies. To my knowledge this policy aspect has neither been incorporated in economic theories of regulation nor has it been used as an explanatory variable in empirical analyses of regulatory reform.

In Section II we try to place cross-country learning in the context of the prevalent explanations of regulatory behavior and reform. Section III looks at specific examples of cross-country learning. Section IV concludes with normative policy consequences from the positive analysis and with suggestions for research.

## II. Conditions for the Transfer of Regulatory Reform Ideas

### 1. Introduction

Why is regulatory reform done in the first place? Under what conditions will regulatory innovations and learning from experiences travel from one country to another? It travels (a) because the conditions for reform are similar in different countries in the same industry and (b) because the reform was successful in at least one country. Item (b) implies that there is a lag between leading and following. Unsuccessful reform can also lead to cross-fertilization by preventing bad policies (the California electricity disaster).

Similar external conditions potentially leading to similar regulatory outcomes and to regulatory reform include changes in market conditions and technological changes. Since such changes occur worldwide and have been very pronounced in the telecommunications sector, parallel regulatory changes in many countries would not be surprising. However, in addition, there continue to exist leads and lags as well as paper trails that show influences of established policies in one country on the new policies in another country.

An example of a technical and market change of this kind is the introduction of ADSL in the local loop. In combination with the strong unbundling policy established by the U.S. Telecommunications Act of 1996 (1996 Act), this led to a regulatory policy of line sharing at the end of 1999. This policy provides access to new entrants to the high frequency part of the local loops owned by incumbent carriers. It is now being copied and, to some extent, adapted in Europe. The U.S. solution showed that line sharing was physically and organizationally feasible in combination with collocation, which the U.S. had pioneered earlier. It is quite obvious in both line sharing and collocation that cross-country learning has been taking place.<sup>1</sup>

Policies that come from different conditions and therefore do not travel easily include the U.K. approach to local telephony by cable TV companies. The U.K. was in the unique position of having a small and expanding cable TV network, when it opened the local telephone market to cable TV companies. In contrast, countries like the U.S. and Germany had a large installed base in cable TV that did not easily lend itself to conversion to a hybrid TV/telephone system.

### 2. Political Economy

The economic theory of regulation, originally developed by Stigler (1971), is based on the optimizing behavior of politicians and interest groups. Regulators would in his framework be subsumed under politicians, who would maximize votes by pleasing some interest groups and burdening others. Peltzman (1976) developed the approach further by introducing imperfect information of voters and organizing costs for interest groups. The imperfect information is never

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<sup>1</sup> Collocation at the federal U.S. level built on learning from earlier state experience, particularly in New York and Illinois. See *Vogelsang and Mitchell (1997)*.

made explicit in his models but it is a prerequisite for the success of interest group propaganda in convincing voters to vote in favor of a politician, who places a net burden on them.

In my view, imperfect information is at the heart of Peltzman's approach. This is precisely where cross-country learning can come in. The experiences of other countries provide information about possible or likely policy outcomes. This information is strong because it is based on actual observations, but it is tainted by the differences between countries. The information is publicly available, but it is even more visible to experts – policymakers and interest groups. Thus, we may expect that experience in other countries would not wipe out the information problem in Peltzman's model. However, it is likely to influence the outcome. In particular, I conjecture that cross-country learning would bend the outcome more in the direction of efficiency and away from voting against one's own interests. This could come about both by following a good foreign example or by rejecting a bad one. Without reference to cross-fertilization, a move in this direction is already anticipated by Becker (1983).

In a way, Becker explains why economists have been fooled so long by the public interest theory of regulation. His observation is that, even in an interest group environment, more efficient policies have a better chance of being implemented than less efficient policies, because the former create more surplus to be distributed than the latter. In other words, the winners win more and the losers lose less under efficient than under inefficient policies. Given the limited resources of politicians and regulators, they would therefore concentrate more on efficient policies. Foreign examples, in this context, act as public goods without exclusion. They reduce the costs of learning about such policies and increase the scope for efficiency improvements. These effects come about, because policymakers could gain an edge by having this information and thereby would have an interest in acquiring it.<sup>2</sup> The same would hold for interest groups. However, interest groups also want to suppress information that is unfavorable to them.<sup>3</sup> Under imperfect information, the winning groups would be the main beneficiaries of inefficient regulation. By lowering information costs cross-country learning would then benefit the burdened and initially less powerful interest groups and thereby make information-suppressing tactics less successful. Cross-country learning could, however, also help the winning groups avoid making mistakes that would cost them support in the future.

### 3. Institutional Endowment

Learning from experience within a country should be easier than learning from other countries with different political, legal and economic institutions and different populations, standards of living and geography. For that reason, learning between countries would occur primarily in sectors, where only a single policy is

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<sup>2</sup> They also come about through the interest of "informants" like myself, who want this knowledge to spread.

<sup>3</sup> *Newbery* (2000, p. 143) argues that interest groups put much effort into concealing unfavorable information and that that is likely to increase the inefficiency of regulation.

applied in a country. The U.S. differs from the European countries by having fifty states that all have their own regulatory policies. This has created the laboratory of the states, from which all of them and the federal regulatory authorities can learn, and that should reduce the incentive to learn from other countries.

Learning between countries requires that their institutional and economic conditions are not too different.<sup>4</sup> Europe and the U.S. have many things in common: a high standard of living, Western culture, a federal structure, and moderate climate. There are also substantial differences: The heterogeneity between countries in Europe is stronger than between states in the U.S., e.g., language, political and legal system, and history. There are also differences in political attitudes towards the market system and social responsibilities of firms and governments. Antitrust traditionally plays a stronger role in the U.S. than in European countries, although Europe has been catching up recently.

Specific differences between the U.S. and Europe in telecommunications result largely from the history of public enterprise and recent privatizations in Europe as opposed to a 100-year-old tradition of regulation of private utilities and regulatory reform in the U.S. They include the degree of vertical integration of the dominant national carriers, and the due process rules applied to regulation and the independence and position of the regulators. The due process rules in American regulation influence the way information enters the regulatory process. A large part of the information is provided by the affected parties. Due process rules help avoid capture of the regulator by the regulated firms. In part they do that by allowing other interested parties to present evidence, which could be the foreign experience.

The long history of U.S. regulation was accompanied by the establishments of regulatory compacts that gave the parties some right to the status quo. Change in regulation has therefore become difficult if, in particular, the regulated firm would likely become a major loser. The avoidance of losers explains, for example, why price rebalancing has been so difficult. In contrast, the history of public enterprises required less due process and formal assurances, because the government represented both the regulator and the owner. Privatization in the U.K. resulted, among others, because public enterprise reforms had failed. In fact, the presence of public enterprises, for a long time, prevented the adoption of regulatory innovations generated in the U.S., for example, in connection with long-distance liberalization.<sup>5</sup> However, once privatization occurred, there was no burden with regulatory traditions. This also implies that privatization, while hard to achieve in itself, enabled a fresh start.

All these differences provide for different starting positions for regulatory reforms and for individual policy measures. From the commonalities arise impor-

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<sup>4</sup> Such differences could themselves be the result of different policies so that cross-country fertilization could nevertheless be in order.

<sup>5</sup> In contrast, *Knieps* (1985) hypothesizes that the federal regulatory structure as opposed to the more unitary policy structure of European countries was responsible for the lack of European liberalization at the time. The explanation for subsequent liberalization in Europe then would have to be that the federal structure in Europe emerged through the EU. This would not, however, explain the British example of liberalization way ahead of the EU.

tant factors that make similar regulatory solutions optimal. For example, both the U.S. and the European countries have the institutional capabilities to implement sophisticated regulations, such as price caps or interconnection rules, which require some regulatory discretion and the ability to commit. At the same time, differences in geography and national backgrounds may prevent the same regulations from being implementable or optimal in both regions. Nevertheless, policies may be copied wrongly, in spite of institutional differences.<sup>6</sup>

International bargaining could play a role in cross-fertilization in cases where one country has an interest that its regulatory policy be applied in other countries as well. This most naturally holds in the case of international telephone traffic that is based on rules of reciprocity for the ruling access charge regime (called accounting rates or settlement rates). It also holds for market liberalization in case a country has strong telecommunications companies that want to become global players. This has been one of the main reasons for U.S. pressure in the WTO context.

### III. Examples of Transfers of Regulatory Reforms

In the following, we will concentrate on some examples of cross-fertilization. These are selective. They leave out the original case for learning from the U.S., the drive to competition in long-distance markets. This showed that small firms were viable in an environment characterized until then by natural monopoly. Although that competition was undoubtedly helped if not triggered by AT&T's cross-subsidized price structure, it ultimately proved that network competition worked. It also showed how cross subsidization is undermined by competition, forcing regulators either to preserve cross-subsidization through high access charges and other universal service policies or to rebalance end-user prices.<sup>7</sup>

#### 1. Independence of the Regulator

Regulatory institutions in the telecommunications sectors of European countries are generally young. They were created as a result of privatization of the incumbent carrier and/or liberalization of the sector. Europeans without regulatory tradition (caused by prevalence of public enterprises) have adopted some of the regulatory institutional features from the U.S., including independence, publicity and process orientation.

The U.S. regulatory institutions could have provided examples for both specialized regulatory agencies like the FCC and for more general agencies like the state public utility commissions (PUCs) or antitrust authorities. To my knowledge, all European countries followed the specialized model. In part, this can be explained by successive privatization, starting with BT in the U.K. BT was the

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<sup>6</sup> I owe this information to *Barbara Cherry*.

<sup>7</sup> See *Newbery* (2000, pp. 153-160) for more on the introduction of long-distance competition.

first utility to be privatized. So, the first regulatory agency was tailored to it and did not quite fit for the next privatization. However, the U.K. could have chosen to attach regulation to competition policy. The task was probably viewed as too overwhelming and specialized to be handled by the somewhat improvising Monopolies and Mergers Commission. Thus, the federal U.S. example probably was quite decisive in choosing a specialized regulator. The U.K., however, deviated from the U.S. model in many other aspects, including the installation of a director general instead of a commission and the embedding of the agency in a ministry rather than giving it a setup of its own. Nevertheless, Oftel and its director general received at least part of the decision-making powers and the independence from the day-to-day operations of the government that the FCC enjoys.

The U.S. example was crucial for any early European regulatory reform efforts in telecommunications simply because it had a long tradition of regulating private telecommunications carriers and because it was the first major country to experiment with competition in the telecommunications sector. Since privatization appeared to be a prerequisite for competition, the European countries had to find a new governance system for the sector if they wanted effective competition. The U.S. regulatory model was the only one to look for. The U.S. model, however, was not ideal. This was known well enough to the Americans, who had introduced competition, *inter alia* because their regulation was less than perfect. It is thus no surprise that the British as the first Europeans to privatize their telephone monopoly rejected many of the U.S. regulatory features. They saw that privatization gave them a chance that the U.S. did not have. They could learn from the U.S. experience better than the Americans themselves because they started with a clean slate, not having to bother about stranded costs. Thus, the Europeans could pick and choose at the time of their sector reforms. In this respect, one has to differentiate clearly between the U.K., which privatized BT at the time of the AT&T breakup, and other EU countries like Germany, which privatized their domestic dominant carriers more than ten years later. The latter countries could learn both from the U.S. and from the U.K.

In summary, the U.S. has been quite influential for Europeans in choosing specialized, somewhat independent regulators, but hardly in the specific regulatory setups.

## **2. Price Caps**

Price caps are the classic and best-documented case of cross-fertilization between the U.S. and Europe. Aside from some experimentation with an early form of price caps in Michigan in 1981-83, price caps in their established form are a British invention. Littlechild (1983) suggested them to the British government for the regulation of BT after privatization. Although Littlechild's suggestion built on earlier academic work, which was partly U.S. based, it is an original policy contribution. Its main American influence came from the sound rejection of the American rate-of-return regulation model. Thus, in this case, the outcome of cross-fertilization was a negative one. Littlechild's suggestion was imple-

mented in 1984 with some modifications and became known as RPI-X regulation.

About 2 years later, the first state PUCs in the U.S. started with their own versions of price caps. These were not usually modeled after the U.K. approach. Rather, the U.S. PUCs experimented with all kinds of incentive regulation approaches, including profit sharing, banded rate-of-return regulation, price moratoria and price caps. PUCs had ample experience with fuel adjustment clauses in electricity and gas regulation, and were probably more influenced by Baumol's (1982) suggestions for inflation and productivity adjustments than by the U.K. experience. Thus, cross-fertilization is doubtful in these cases. This changed in 1987, however, when the FCC initiated price cap proceedings for AT&T and for access prices charged by local exchange carriers. In its notice of proposed rulemaking the FCC then was referring, among others, to the British experience. In fact the suggestion and the schemes implemented bore large resemblance with the U.K. model. It was clear that, in this case, the U.S. was learning from the U.K. However, the price caps adopted for AT&T deviated from BT's RPI-X by a number of features, such as the introduction of bands for price increases and price reductions of individual services. These changes resulted from the partisan process of U.S. regulation and from the fact that AT&T was already facing strong competition in its regulated long-distance markets, something that was lacking in the U.K. at the beginning of BT's regulation. Consumer groups wanted to be protected from individual price increases, while competitors wanted to be protected from exclusionary behavior through excessive price reductions. It is interesting that these new features do not appear in price cap regulation adopted later, for example, in Germany. Either the new competitors did not yet see the issue or, in 1997, they did not yet have the political clout to effect such changes.

Another difference between the U.K. model of price caps and the U.S. model comes from the U.S. tradition in rate-of-return regulation. When price caps were introduced, the U.S. carriers had a right to a fair rate of return. Much care needed therefore to be taken in determining the X factor, which was done through productivity estimates. In contrast, the British started with a clean slate during privatization of BT. Thus, the original X factor could be determined more freely and the methodology for its adjustment developed en route. This led to a more pragmatic and forward-looking approach in the U.K. than the U.S.<sup>8</sup>

By their very nature, price caps are a very flexible instrument. Flexibility has the advantage that price caps can be tailored to specific situations and therefore easily adapted to the local circumstances of a particular country. It has the disadvantage that commitment to a specific practice is hard to make. Also, price caps can be bent towards the interests of particular groups. It appears that price caps initially were almost always bent in favor of the incumbent firms. This was true in the U.K., in the U.S. (both at the federal and at the state level), and in

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<sup>8</sup> For these differences between the U.S. and the U.K., see *Beesley and Littlechild* (1989) and *Crew and Kleindorfer* (1995).

Germany.<sup>9</sup> Thus, cross-country learning could have proceeded by lowering the incumbents' opposition against price caps.

To summarize, price caps are probably one of the best-documented cases of cross-country fertilization.

### 3. Universal Service and Rate Rebalancing

The U.S. has had implicit and explicit universal service policies at least since 1970. The policies were used primarily to keep local residential telephone rates low. The declared aim was high penetration throughout the country. The means of achieving the low rates included cross-subsidization through interstate access charges and business rates and, more recently, explicit subsidies raised as surcharges on long-distance rates and on monthly charges. The main subsidy flow today occurs from high-density states to low-density states and, within states, from high-density to low-density areas. This policy has become very costly in terms of allocative distortions, and it includes substantial amounts of redistribution. The policy is administratively cumbersome and is likely to retard and distort competition. To some extent the European countries have copied the U.S. by introducing universal service policies. However, their policies are usually much weaker and, as a result, potentially less distorting. In particular, in contrast to the U.S., the European policies have not stood in the way of rebalancing of end-user prices. While European countries generally have geographically uniform rates within each country, the U.S. has local service rates that tend to vary inversely with costs (Rosston and Wimmer 2001).

In her discussion of universal service and rebalancing in Europe as opposed to the U.S. Cherry (2000) brings out the conditions that would prevent the (inefficient) U.S. policy from being adopted in Europe and the (more efficient) European policy from being adopted in the U.S. These factors are largely institutional. The first is that the European Commission could simply delegate the rebalancing and universal service decisions to the NRAs, because there existed no transnational subsidy mechanism. In contrast, the FCC had to get involved in redistributive issues between the states. Dismantling the implicit redistributions in the pre-1996 Act universal service schemes would have created a number of losers sure to oppose such a move. Thus, state regulators would have been unable to rebalance rates. The 1996 Act in principle allowed for rate rebalancing through explicit subsidy mechanisms. However, the implicit transfers had been so high that they could not all be converted into explicit transfers. Thus, the new mechanisms would not fully enable rebalancing and would create winners and losers among states. In order not to reveal the latter, the provisions were left opaque, and expressions like rebalancing were left out of the Act. Congress left the universal service provisions for the FCC to implement, and the FCC chose to do part of that by limiting the ability to rebalance.

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<sup>9</sup> Germany also has no financial model of the DTAG, as Ofcom does for BT, or total factor productivity measurements, as are available to the FCC.

In contrast to the FCC, the European regulators faced much less organized groups opposing their policies. Regulators here were new institutions and competitors and consumer groups had not yet established themselves to the same extent as in the U.S. with its 100 years of regulatory tradition. Interestingly, the European solutions to rebalancing and universal service differ substantially between countries, although none comes close to the U.S. universal service policies. The U.K. is probably farthest in terms of rebalancing. It therefore needs virtually no universal service policy. France has an expensive universal service policy, preventing some rebalancing. Germany has neither rebalanced nor has it an intrusive universal service policy. Some rebalancing is allowed by the German telecommunications law (TKG). However, increasing competition could then force the universal service issue.

In the U.S. the universal service policy has a strong backing both from traditional cross subsidies and from the extreme variation in telephone network densities and therefore costs. Thus, rather than reducing the scope of universal service, the 1996 Act has increased it. The Europeans certainly were aware of the U.S. policy but decided not to copy it. Besides the institutional reasons given above the geography has played a major role. For example, calculations for the U.K. showed that the costs to BT from providing universal service were negligible and probably counterbalanced by advantages from being the universal service provider and from having geographically unified tariffs. The calculation may have been helped by the rebalancing that BT had undertaken since 1984, which resulted in real increases in line rentals. Similarly, in Germany the DTAG seems not to have approached the RegTP yet in order to gain geographic deaveraging of monthly line charges.

The European learning from the U.S. on universal service policy has been one largely of avoiding the U.S. mistakes in this area.

#### **4. Access/Interconnection and Unbundling**

Interconnection and access charges have become the key issues in network competition in telecommunications. Much of the approach to interconnection and bottleneck access granted to new telecommunications competitors is originally based on the U.S. essential facilities doctrine. This doctrine first emerged in an antitrust concept in a U.S. court in the early 1900s. It found its way into regulated industries again first through antitrust and then through regulatory commissions, the FCC in particular. Application of the essential facilities doctrine requires behavioral control over time, something that is better accomplished under regulation than antitrust (Areeda 1990).

The FCC and courts granted discriminatory access of new long-distance carriers to the local networks of incumbents during the 1970s. Equal access was then implemented in the course of AT&T's divestiture in 1984. At that time, it was well established that long-distance competition required local access. So, when BT was privatized in 1984, interconnection of its network with the emerg-

ing Mercury was part of it.<sup>10</sup> However, the British provisions were based on private negotiations with Oftel as the arbitrator in case of disagreement. In fact, Oftel was called in and subsequently de facto regulated conditions of access and access charges. Included in these were long-distance connections that never were regulated in the U.S.

In the area of interconnection a large number of problems needed to be solved, as competition was progressing from long-distance to local networks and into more and more services. In the course of this, the U.S. and U.K. came to represent two fairly distinct models. The U.S. was generally more open to the choice between infrastructure and service competition. By facilitating interconnection and other ways of helping entry, such as resale, the U.S. in fact allowed for service competition without major facilities. In contrast, the U.K. was heavily favoring infrastructure competition. As a result, Oftel did not force BT to offer unbundled parts of the network and collocation that would enable entrants to pick and choose, which parts of the network they would provide themselves and which they would get from the incumbent. Rather, Oftel concentrated on interconnection charges as a means to direct investment. In contrast, the U.S. forced the incumbents to make all parts of the network available to entrants. This policy was developed first in progressive states, such as New York and Illinois, and by the FCC in the Open Network Architecture (ONA) and Expanded Interconnection Proceedings.<sup>11</sup> Solving the problems of unbundling and collocation required regulatory, organizational and technical problem solving that was pioneered in the U.S. The European countries could thus take advantage of the U.S. footwork and its good and bad experiences. None of the European countries followed the full unbundling that the U.S. pursued. However, they also did not follow the U.K. approach of no unbundling. For example, the U.S. practice had shown that, among the unbundled network elements, only local loops were really in demand. Supplying them required collocation. Thus, the Europeans largely restricted unbundling to the loops and introduced collocation. By EU directive, even the U.K. is now forced to follow suit.

While access and interconnection policies were originally conceived in the U.S., cross-fertilization is now starting to take place, especially outside the U.S.

## 5. Proxy Cost Models

While the U.S. pioneered the right of access, based on the essential facilities doctrine, it was the U.K. that pioneered the price of access, first, by unsuccessfully trying out a version of the efficient component pricing rule (ECPR) called "access deficit contributions", and, second, by including the use of the first incremental cost models (that themselves were first developed by Mitchell, 1990, in the U.S.). It is not clear that the U.S. cost models benefited much from the U.K. example. They turned out to be much different. Both the U.S. and the U.K.

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<sup>10</sup> Mercury received a network license already in 1982, but the interconnection issues took some time to emerge.

<sup>11</sup> For details, see *Vogelsang and Mitchell (1997)*.

access and interconnection prices have become yardsticks for European countries not depending on cost models.

Long-run incremental costs have become a widespread standard used by telecommunications regulators for access and interconnection charges and for prices of unbundled network elements. In the U.S. they have also become the basis for calculations of universal service subsidies. Longrun incremental costs are by definition efficient. Regulating by longrun incremental costs is therefore very different from cost-plus or rate-of-return regulation. Rather than gaining longrun incremental costs from accounting data they were found in engineering cost models. Such models were first developed in the U.S. at the RAND Corporation (Mitchell, 1990) and the NRRI. The use of such costs for interconnection pricing was then proposed in an EU-sponsored study in 1994 (WIK/EAC, 1994), which included U.S. participation and experience. It was taken up in practice by U.S. PUCs in the mid 1990s and in the 1996 Act as well as by OfTel in the U.K. around the same time. The use of such models was thus pioneered on both sides of the Atlantic.

In the U.K. the model development occurred as an OfTel initiative, bringing together industry experts from BT and its competitors. Since BT favored an accounting-based top-down modeling approach in contrast to the bottom-up engineering approach, the British effort resulted in two models that were reconciled with the help of economic consultants (NERA). The U.S. cost modeling started with industry-sponsored engineering models with heavy inputs from consulting firms. The models were more technical, geographically disaggregated and detailed than the British models. At that time, the U.S. industry had large modeling capabilities in organizations, such as Bellcore, the then consulting and research arm of the RBOCs. The competing U.S. models came to vastly different results. Thus, the FCC had to find the "correct" model. Rather than deciding on a single one of the competing models, it developed its own hybrid model. Nevertheless, the other models were used in state PUC determinations of interconnection charges, and the know-how was exported to other countries. The German WIK cost model, for example, was based on a later version of the original NRRI model. The current WIK models have substantially advanced from there and contain many new features. However, it is clear that a lot of cross-fertilization has taken place in this area, and it is not just restricted to the U.S. and Europe but extends to countries like Australia.

The use of model-based rather than firm-based costs in regulatory proceedings has been highly controversial and has been challenged in court. In the U.S., this happened shortly after the FCC had issued its monumental Local Competition Order in August 1996. In 2000, a federal U.S. appeals court found that costs, though forward-looking, have to be based on actual firm data. This decision is on review at the U.S. Supreme Court but it can likely lead to a re-thinking of the approach used in practice. In Germany, a court issued a similar decision in 2001 with the result that the RegTP based its subsequent order on international benchmarks (which themselves are probably based on the efficient firm cost standard). Thus, a new round of learning can be expected.

## 6. Spectrum Auctions

Spectrum auctions were suggested in the academic literature at least four decades before being first applied in 1989. While New Zealand was the actual innovator, the New Zealand second price, sealed bid auction design contained major flaws, because the second price was often ridiculously low (Mueller, 1993). The U.S. followed in 1994 with an innovative design. Since auctions played a major role in the application of game theory to economic issues and since spectrum auctions posed challenging theoretical problems, it was not surprising that the approach used by the FCC to spectrum auctions was heavily influenced by academic consulting input (Kwerel and Rosston 2000). In collaboration with those consultants, the FCC developed a sophisticated simultaneous multiple round auction design that allowed for bidding on many geographic spectrum licenses at the same time and allowed for several winning bidders in each area. Bidders can simultaneously bid on licenses in all geographic areas. The auction is over if no increased bids are recorded for any area. The amounts of leading bids are known at any moment in time. The simultaneity allows bidders to accumulate complementary licenses without being stuck with a single one and not being able to acquire the other. The completely new item in this auction design was the activity rule proposed by Milgrom and Wilson for the purpose of progressing in an auction with potentially many bids and potential complementarity between licenses.

The U.S. auctions were highly successful in raising revenues and allocating licenses in consistent ways. Analysis of the outcomes shows that they were quite efficient (Cramton, forthcoming). However, some problems appeared and had to be solved, and there were unanticipated flaws. Problems arose with collusion, because the FCC initially allowed for unrestricted bid increments that enabled signaling collusion via the last digits of the bid amounts. Other problems included the conflicts between local and nationwide licenses and the collection of auction revenues. The last of these was due to a design flaw. Small-firm bidders were allowed to stretch payments into the future. They could therefore compete without having the necessary financing and would be induced to bid too high. When these bidders could not raise the money for build out and for the licenses, they declared bankrupt. A related flaw resulted from bidder preferences for small firms in the form of discounts on the bid price. This was done in a separate auction for small bidders. The result was that these bidders bid away the discounts among each other. Having these problems resolved the U.S. auction methodology emerged as a successful model that was exported by consulting firms to other countries.<sup>12</sup> However, these countries did not blindly copy the U.S. approach but rather added their own features. Noteworthy is, for example, the British approach of reserving one license to newcomers or the German approach of endogenizing the number of winning bidders between four and six.

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<sup>12</sup> In the course of this, it turned out that some of the features that were successful in the U.S. contained some hidden flaws. The activity rule, for example, could be used as a commitment device to restrict bidding in the future. See *Grimm, Riedel and Wolfstetter* (2001).

Spectrum auctions, even more so than price caps, are noteworthy for the strong involvement of academic economists. In this case, they were the inventors and took major part in developing the innovation and in the dissemination.

#### IV. Conclusions and Outlook

Telecommunications has for a long time been an innovative sector, characterized by technical change, new products and substantial growth. It has also undergone institutional reform in most parts of the world. The institutional reform started in the U.S., making it the leader in liberalization and deregulation policies. The characterization as a leader implies that there are followers, and the U.S. example certainly influenced reforms in other countries. However, that did not mean the other countries copied the U.S. model. Rather, U.S. policies were adapted. Also, other leaders, such as the U.K., emerged with reform efforts more suited to European countries. In some respects, these reformers overtook the U.S. and made the U.S. look abroad for better solutions. Our examples show that there are clear cases of cross-fertilization, such as price caps and proxy cost models. There are other cases, where the influence of another country is less apparent, so that common causes may have led to similar outcomes. This could, for example, hold for regulatory institutions. Having a clear leader acts as a focal point that facilitates information gathering and thereby cross-country learning. Now that the U.S. has fallen behind there are several competing sources of regulatory reform so that cross-country learning, while richer may also have become informationally more demanding.

What is the verdict on cross-fertilization in terms of improved efficiency? What are the patterns? Do we find that efficient policies are copied/adapted and inefficient policies rejected? In order to answer these questions conclusively, one would need empirical studies that demonstrate the efficiency of a chosen instrument compared to those that were not chosen. Such studies are hardly available at all. The only area that is fairly well researched is that of price and profit regulation. In particular, price cap regulation has been compared to rate-of-return regulation and profit sharing in the U.S. context. Somewhat weaker than empirical evidence is a comparison by use of theoretical models, such as the Averch-Johnson model for rate-of-return regulation. Such models, however, only exist for very few policies and are themselves full of controversies. For example, for access pricing the ECPR is promoted by theoretical arguments as is the Ramsey pricing rule or the marginal cost-pricing rule. It is not that these theories contradict each other. Rather, they differ in the view on empirical regularities to which they are applied.

My subjective assessment of some of the cross-country learning is:

(a) New Zealand had, in the 1980s, decided to leave telecommunications issues in the hands of its general competition policy. This ran into problems, when bottleneck issues could not be resolved and ended up in court for several years. This experience suggests that a specialized agency is probably superior, as long as competition is not fully viable. The reason is that competition depends on interconnection of essential facilities. It is, however, well known that the pro-

vision of essential facilities is better regulated by a specialized agency than by antitrust authorities (Areeda 1990).<sup>13</sup> Following the U.S. in terms of establishing a specialized agency was thus efficient. The result of even limited European learning from the U.S. regulatory institutions is that the institutional setups in the U.S. and Europe are now much more compatible than they were before privatization and regulatory reform in Europe. As a result of this institutional rapprochement, one can expect that cross-fertilization in regulatory contents should be facilitated for the future.

(b) Price caps seem to be genuinely a superior regulatory mechanism (Newbery 2000). In spite of that, the quantitative empirical evidence on price reduction, cost reduction and investment compared to conventional regulation, while significant, is not impressive (Sappington, forthcoming). The early experience in the U.K. of price caps for BT shows strong rebalancing and overall cost reductions that allowed for successive increases in the X factor. The claimed superiority of price caps holds not only for monopoly regulation but also, in particular, for the transition to full competition. Price caps allow for rebalancing and competitive responses and, at the same time, protect consumers and provide incentives for cost reductions. The U.S. has been substantially more restrictive than Europe in limiting rebalancing, and that has reduced some of the incentive effects of price caps.

(c) The difficulties in making U.S. universal service policies compatible with market competition shows the policy dilemma in correcting inefficient policies. The fact that Europe did not copy these policies shows differences in the institutional settings and that inefficient examples may have deterring effects.

(d) In contrast, access, interconnection and unbundling policies demonstrate cross-fertilization that is efficient with respect to the general principles of these policies, but may be overly bureaucratic and restrictive when it comes to specific rules.

(e) This also comes out in the proxy cost models that are highly sophisticated with great technical and geographic details. Cross-fertilization has led to much improved models but certain crude factors remain that account for large differences between models. These can lead to inefficient policy outcomes as can the application of these models to an inefficient policy, such as the U.S. universal service policy.

(f) Auctions are theoretically the most efficient way to distribute scarce spectrum. They allocate it to the bidders with the highest prospective value and lead to government revenues that can replace distortionary taxes. However, practical application of auctions does not always assure this outcome, as shown in the early New Zealand auctions. Cross-country fertilization with academic input, in this case, provided major improvements, although the road to success continues to be bumpy. This shows that auctions are complex institutions. Nevertheless, the record suggests that auctions have been superior to other mechanisms in

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<sup>13</sup> Nevertheless, Australia has integrated the regulation of network utilities in the ACCC, which is a general competition authority.

speeding up allocation and getting the spectrum in the hands of users with high values.

Examples, where cross-fertilization did not take on, include the following: Nobody followed the U.K. duopoly policy, which was a disaster, because it prevented further entry for seven years without assuring a strong duopoly. Nobody followed the U.K. access deficit contribution, because they were too cumbersome to administer and were ineffective. Nobody followed the U.K. dispute resolution process, although it provides strong stability and commitment power (Spiller and Vogelsang 1997). The reason here is probably that it required the preexistence of a trusted institution. The lesson from these negative examples is that learning is either prevented by geographic/institutional differences or it takes the form of rejecting policies deemed unsuccessful.

From the examples, can one learn anything more general about the efficiency of cross-country learning? Certainly, more empirical analysis of the efficiency effects would be required to answer this question. These would have to be guided by more specific and more elaborate theoretical hypotheses from the institutional and political economy literature than those developed in Section 2 above. Specifically, from the above examples one might expect that cross-fertilization would be quite successful in transferring difficult technical tools (such as auction design or cost models). This is likely to be efficient if the tools are applied to an efficient policy but they might not be. There is, in particular, the danger that a tool is transferred to an inadequate institutional setting. However, if an efficient solution is implemented in country A and if country B is institutionally very similar we also expect a transfer. The empirical question therefore is if the relevant actors correctly perceive the efficiency of foreign policies and their applicability to the domestic situation.

Since learning from foreign experience is a form of free riding, the question arises, How does a country become a leader in the first place? An example among the U.S. states provides one answer. Here the states of New York and Illinois were the definite leaders in the introduction of local telephone competition before passage of the 1996 Act. The explanation appears to be that they have the largest and densest metropolitan areas among U.S. states. In these metropolitan areas the pressure for entry and the feasibility of entry was the greatest.<sup>14</sup> So, they became natural leaders. In such cases, there exists compensation for first-mover disadvantages, such as making mistakes by moving into uncharted territories and incurring large setup costs of new policies. It is harder then to explain why the U.S. and the U.K. became leaders in telecommunications regulation among countries. This is particularly hard because of direction of causality. Definitely, the U.S. has traditionally been the country with the largest telecommunications demand. But was that due to the geography and economic strength of the country or to the way its telecommunications sector was organized? Thus, is the reason private enterprise (with a mission for universal service) as opposed to the PTTs in Europe? Did the U.K. become a leader in the 1980s because it was the first (among large European countries) to privatize its PTT?

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<sup>14</sup> In empirical work, *Zhuang* (1999) has shown that states in the U.S. with higher population density adopted incentive regulation earlier than states with less dense populations.

Where can we expect the exchange of new regulatory ideas and practices to become most important in the future? Two big problems, in particular, need solutions in Germany. They are which parts of the telecommunications sector to deregulate and how to expand competition in the local network. For both, no ready-made foreign solution is available at this time. Deregulation was spearheaded in New Zealand, but its radical approach showed more failures than success. In contrast long-distance competition was successfully deregulated in the U.S., in part due to the vertical separation of AT&T in 1984. Such separation would be a hard sell in Germany at this time. Local competition has been introduced quite successfully in the U.K., but this is based on cable TV networks, starting from a small base that is no longer available in Germany. Here, the U.S. approach may be more doable. It is based on a combination of alternative networks, unbundled local loops and service resale. The success of local competitors in terms of market share in the U.S. is substantially higher than in Germany, but it is still quite moderate. So, there may not exist a quick solution in this area.

### Summary

Cross-country learning and cross-country fertilization have played a major role in telecommunications reforms worldwide. Such cross-country effects could be explained by the same factors that are responsible for regulatory changes in general, including interest group pressures, organization costs and asymmetric information. These are often conjectured to lead to redistributive and sometimes efficiency-reducing outcomes. However, the practical information provided by other countries' experiences makes one hopeful that cross-fertilization has welfare-enhancing effects both by deterring bad examples and copying good ones. Examples of regulatory changes from the telecommunications sector suggest that such benevolent effects occur but are by no means assured. More empirical and theoretical work is therefore needed to assess the impact of cross-fertilization for regulatory reforms.

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