

# Defining and financing an intermodal USO

**Christian Jaag**  
**Urs Trinkner**

**Swiss Economics Working Paper 0035**

**July 2012**

**ISSN 1664-333X**

Presented at the 20th Conference on Postal and Delivery Economics, May 30<sup>th</sup> - June 2nd, 2012, Brighton, U.K.

**Swiss Economics SE AG**  
**Stampfenbachstrasse 142**  
**CH-8006 Zürich**

**T: +41 (0)44 500 56 20**  
**F: +41 (0)44 500 56 21**

**[office@swiss-economics.ch](mailto:office@swiss-economics.ch)**  
**[www.swiss-economics.ch](http://www.swiss-economics.ch)**

# Defining and financing an intermodal USO<sup>1</sup>

Christian Jaag  
Urs Trinkner

Swiss Economics and University of St. Gallen  
Swiss Economics and University of St. Zurich

## 1. Introduction

This paper discusses the potential for an intermodal definition of universal service obligations in post and telecommunications.

Declining letter mail volumes will continue to challenge postal operators in the years to come. As a consequence, the scope and definition of the postal universal service obligation (USO) is increasingly debated among politicians, practitioners and academics. In response to a sharp decline of overall mail volumes in the US and large deficits, the United States Postal Service has filed a request to deliver on five days a week instead on six. Analogous considerations are taking place on the telecommunications side, where it is discussed whether the traditional voice-based USO should be complemented or substituted by a broadband USO for broadband services. For example, the European Union amended the universal services directive 2002/22/EG in 2009 to complement the USO with broadband access, however without prescribing a specific bandwidth (2009/136/EG). A year later, the EC expressed in its “Digital Agenda for Europe” the objective that all Europeans should have access to internet of above 30 Megabits per second (Mbps) by 2020.

These parallel, but not integrated discussions on reducing the postal USO on the one hand and extending the telecommunications USO on the other can be explained by the partial convergence of the two industries. Written communication, once the exclusive domain of postal operators, is increasingly relying on digital media that are transmitted over telecommunication infrastructures. As a consequence of this convergence, the telecommunication infrastructure has become an essential infrastructure for written communication, while physical letter mail is of decreasing importance.

From a regulatory perspective the question arises whether and if so, how this convergence should reflect itself in the definition of the USO on the postal and/or telecommunications side.

Maegli et al. (2010) have proposed a “unified approach” to regulate universal services in posts and telecommunications. Such an approach would consist of a jointly defined universal service obligation and corresponding regulation, together with a separated, sector-specific regulatory regime for monopolistic bottleneck resources and interconnection issues. This framework would be consistent with the layer-oriented framework often applied in the telecommunications market (“disaggregate approach”, see Knieps, 2002). Jaag and Trinkner (2011c) have elaborated the issue further. With respect to the postal USO, they propose a future-oriented definition of the USO which follows the economic two-sidedness of the postal market.

In this paper, we extend the framework proposed in Jaag and Trinkner (2011c) to assess the potential of a truly combined “USO in communications”, i.e. a USO that simultaneously defines the physical and digital requirements for the conveyance of communication irrespective of the specific sector. We base our recommendation on the findings on a generic theoretical model of the social

---

<sup>1</sup> Earlier versions of this working paper included a more detailed discussion of an intermodal USO financing. The corresponding calculations are reported in Trinkner et al. (2012). Sections 3 and 4 are based on Jaag and Trinkner (2011c).

cost of USO from Trinkner et al. (2012) which trades off potential savings in daily physical delivery against the one-off cost of developing broadband access networks.

The paper is structured as follows. In Section 2 we summarize the possible economic foundations to the USO. These are the basis for the derivation of a specific economic “rationale for the USO” in Section 3. We then analyze in Section 4 emergence of electronic substitutes, backed by the USO the telecommunications sector, whether there are alternative means to fulfill the economic rationale behind the USO in a more efficient way, and the long term impact of converging postal and telecommunications markets on consumer needs. Taking into account generic principles in the definition of universal services, we define in Section 5 an intermodal universal service for postal and telecommunications consisting of two different and in itself content-neutral connections: one for the delivery of physical goods, and one for the transmission of signals. In that, the traditional USO with postal and telecommunications services is transformed to a universal service for logistics and communications. We conclude in Section 6.

## 2. Economic foundations of the postal USO

In order to understand the underlying need for universal services and develop recommendations for its adaptation in an electronic age, this section presents an economic foundation to the USO. There are different ways to motivate the postal USO using economic theory.<sup>2</sup> In this section we apply the economic framework as presented in Trinkner (2009a) and Jaag and Trinkner (2011b) to the postal sector. Thereby, we summarize the main contributions in the field and elaborate on the relevant economic concepts to explain the USO.

### Perfect markets: Redistribution

In perfectly competitive markets, the resulting competitive equilibrium is Pareto optimal (first fundamental theorem of welfare economics). Hence, there is a priori no need for regulating universal services.

The second theorem of welfare economics establishes that by use of appropriate lump sum transfers, one can achieve different Pareto efficient market equilibria with different wealth distributions. This second theorem gives rise to a first fundamental source of market interventions: redistribution. For example, if a society agreed on a social goal like an even income distribution, it could do so by appropriately defining lump sum transfers. Lump sum transfers are hard to establish in practice due to asymmetric information and transaction costs. Following Cremer et al. (2001, 2008) uniform pricing obligations can be seen as a 2<sup>nd</sup> best redistributive pricing policy to contribute to the targeted wealth distribution. Uniform pricing has at least two redistributive effects, from business customers (low cost, high bargaining power) to private customers (high cost, low bargaining power) and from densely populated regions to remote regions with high-cost delivery. Crew and Kleindorfer (2002, p. 12) argue that the deregulation’s likely primary driver is based on such redistribution grounds.

### Market imperfections

Sector-specific deviations from the perfect market paradigm are a second source to explain the postal USO. Recall that the perfect market assumption lies at the basis of the two welfare theorems. Important assumptions are:

---

<sup>2</sup> An overview over normative and positive concepts is provided in Cremer et al. (2001).

*Assumption 1:* Any company or consumer in the economy acts as price taker, i.e. there is no bargaining or market power;

*Assumption 2:* Markets are complete, i.e. there exists a price for every good – there are no externalities (or they are readily traded and thus internalized correctly);<sup>3</sup>

*Assumption 3:* Information is symmetrically distributed (no asymmetric information) and there are no transaction costs.

These assumptions are very rigid and they are hardly ever met in practice. This gives room for market failures. Market failures are “situations in which some of the assumptions of the welfare theorems do not hold and in which, as a consequence, market equilibria cannot be relied on to yield Pareto optimal outcomes” (Mas-Colell et al., 1995, p. 350). As a consequence, general and sector-specific regulation tackling the relevant market imperfections can potentially result in efficiency gains.

### **General market imperfections across sectors**

Many deviations from perfect markets can be observed in most if not all markets. Generally, it makes sense to tackle them uniformly and equally among all sectors of an economy. First of all, and in light of important information asymmetries, any society must find ways to allocate and enforce property rights, and to secure commercial freedom and free adjustment of prices. Consequently, an important share of civil and commercial law deals with securing property rights and making contracts better enforceable in a world of incomplete contracts and asymmetric information. Further important sources of general regulations are competition or antitrust laws aiming to limit harmful abuse of market power.

With respect to postal services, relevant general law includes the legal status and means of written (handwritten and electronic) signatures to enforce property rights. Historically, handwritten signatures have been complemented with registered mail services which are often part of the legal framework.<sup>4</sup> In that they become official means to enforce contracts, thereby improving market efficiency. Following the idea of Dietl and Trinkner (2009), this role requires the combination of two features being offered in the market place: (1) legally binding proof of receipt for written correspondence, e.g. registered mail services, and (2) a network that can reach everybody based on her name (and physical and/or electronic address). Where the market does not provide such services, corresponding sector-specific USO regulations in postal and/or telecommunications acts might be appropriate to improve overall market efficiency.

### **Sector-specific market imperfections**

Sector-specific deviations from the perfect markets assumptions 2 and 3 provide important motivations for the postal USO.

#### *Externalities*

External effects are present when one economic agent’s action affects the actions of other agents in the economy. External effects can be positive or negative and are closely linked to incomplete markets; when an economic agent’s own action has a positive effect on others but is not rewarded in return, there exists no market for this external effect. In general, when external effects are present,

---

<sup>3</sup> For the link between incomplete markets and externalities see Arrow (1969).

<sup>4</sup> Code of obligations, tenancy laws and many other acts often include registered mail services. Thereby, it is assumed that such services are available (or regulated elsewhere in detail).

market equilibria are not efficient, as these effects are not taken into account in individual decisions and induce an “externality” (positive or negative). However, potentially, they can be “internalized”, e.g. by public obligations, taxes, quotas or the allocation of property rights (where these are in fact enforceable without causing excessive transaction costs, see Coase, 1960, Mas-Colell, 1995).

There are three approaches to motivate the postal USO based on externalities; each of these is described in detail below.

*Classical view:* The utility of a user increases with the number of users connected to the network. For example, a phone subscription is much more valuable if others are connected to the network too (among others, cf. Willig (1979). Hence, one agent’s decision to subscribe or not affects the utility of others.

In this view, a USO can be seen as a policy to correct market inefficiencies caused by (network) externalities. Similarly, letters as a media might be much more attractive if everyone can reach anyone. While the argument is not contested in telecommunications where recipients must pay a price to be connected to the telecommunications network (see e.g. Riordan, 2001), the situation is different in the postal markets. Cremer et al. (2008) claim that this view is “probably of limited relevance for the postal sector”, as it relies “on a symmetric view of externalities where all subscribers are potential callers and receivers” (p. 27).<sup>5</sup> The crucial question in the classical view is whether postal operators are able to internalize network externalities through differentiated pricing in a completely deregulated market. Independently of the symmetry-argument by Cremer et al. (2008), one can argue that there are network externalities that cannot be internalized by price differentiation of postal operators in a completely deregulated market if there are (1) capacity costs or fixed costs that require two-part tariffs for first-best pricing combined with (2) non-excludability of consumption with regards to the fixed part of the two-part tariff. Because of potential free riding, this is indeed the case in the postal market: For a sender it will not be optimal to pay the postal service the fixed fee. Instead, it will be optimal to share the fee with a neighbor or use consolidators. Operators may react by suboptimal coverage (too low) and/or suboptimal pricing (too high), leading to a failure to internalize the network externalities optimally. This would raise the need for a nationwide USO in coverage and affordability.

*Two-sided market view:* Closely linked to (or a more modern view of) network externalities are externalities between different market sides of a platform. Where lump sum price redistributions between market sides affect overall demand, markets are said to be two- or multi-sided (Rochet and Tirole, 2006). These pricing implications are crucial, and often one market side remains heavily subsidized. Many network industries, such as telecommunications, cable networks and postal markets can be understood as being such platforms. The larger the one side of the platform, the greater the utility on the other side of the platform. Such cross-side effects inhibit externalities that might call for USO regulations.

There is no doubt that postal markets are two-sided (e.g. Panzar, 2006, Cremer et al., 2008, Jaag and Trinkner, 2008). Postal operators are platforms (intermediaries) that link senders and recipients, as well as sellers/businesses and buyers/clients. The larger the recipient base, the greater are the business opportunities on the sender side and the more attractive are letters as a medium/platform. Conversely, recipients may be more likely to empty their mailbox if they can expect many letters from a large sender base.

---

<sup>5</sup> In the telecommunications market, a large part of the consumers sends (calls) about as much as it receives whereas in the postal market, net flows are strongly imbalanced. A small group of large mailers accounts for a large part of the items sent. Correspondingly, a high fraction of recipients receives much more postal items than it sends.

Jaag and Trinkner (2008) discuss the implication of the two-sidedness of the postal market on pricing and show the importance to subsidize the recipient side of the market. Their results support the “sender pays principle” of today’s postal markets including free home delivery as ensured by today’s USO.

Cremer et al. (2008) show in their two-sided market model that a profit maximizing postal operator will chose a suboptimal low quality in delivery (coverage or reduced frequency of service) leading to a decrease in demand.<sup>6</sup> The authors conclude that “this problem might be solved, or at least mitigated, through a USO” (p. 28) and thereby provide a basis for quality and coverage constraints.

The definition of two-sided markets may also provide support for uniform pricing, as illustrated by the following example. Postage is usually charged to the senders. However, the charges are often passed on to the recipients, e.g. by banks or distance mail order companies. If these pass on single piece prices instead of wholesale prices collected by the postal operators (which is very often the case), the price signals in the market (single-piece price) are higher than the effective (wholesale) prices charged by the platform. Under uniform pricing, there is no difference and hence overall demand will be higher.

*Public/merit good:* A third view introduced by Gori et al. (2002) is that the postal network can be characterized as public good, independently of the services offered to the consumers (e.g. social cohesion, functioning of democracy, ethical issues). Cremer et al. (2001, 2008) argue that such a network can be understood as producing “externalities that are non-trivial in nature”. Hence the USO (especially accessibility requirements for traditional post offices) would be a mechanism for the provision of the public good (even if the mere postal services were private goods). Hence, public goods might offer a second line of argumentation to justify social issues, or alternatively, be used to support redistributive pricing policies.

#### *Information asymmetries*

An important issue related to asymmetric information is the hidden characteristics of postal services. Traditionally, quality of service has been hidden information (the sender cannot observe the quality of service as the service is fulfilled on the recipient side). In turn, adverse selection cannot be excluded which may lead to suboptimal quality in the market. In this light, the USO with corresponding regulatory authorities might be seen as a measure to ensure a standard quality in the market with the least cost of monitoring.<sup>7</sup> Note however that in some market segments, track and trace solutions are becoming the standard means for delivery, allowing senders to observe the delivery status of their items. This resolves the issue of asymmetric information.

#### *Transaction costs*

The primary role of postal services is to overcome distances between senders and recipients. Postal services act as intermediaries that consolidate mail of different senders. As a result, transaction costs for the delivery of letters and parcels are reduced greatly compared to self-delivery by individuals due to the exploitation of economies of scale, density, and scope.

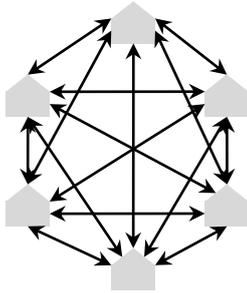
---

<sup>6</sup> The model assumes that senders’ surplus depends on the number of households that can be reached at a certain level of service. When a call externality is introduced into the model (increasing utility of addressee in number of mail items received), the results are reinforced.

<sup>7</sup> Asymmetric information is present in many industries. Regulation is required where the industry fails to develop credible solutions (e.g. quality certificates).

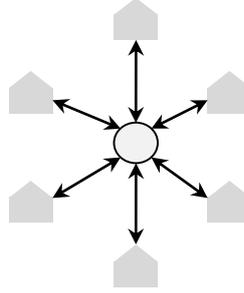
**Figure 1: Post as intermediaries that minimize transaction cost**

Delivery without intermediary



Number of Links:  $(n, 2) = 15$

Delivery with intermediary



Number of Links:  $(n, 1) = n = 6$

In the limit, with a high number of senders and receivers, a postal system has a low number of connections compared to self delivery:

$$\lim_{n \rightarrow \infty} \left( \frac{\binom{n}{1}}{\binom{n}{2}} \right) = \lim_{n \rightarrow \infty} \left( \frac{n}{\frac{n!}{2!(n-2)!}} \right) = \lim_{n \rightarrow \infty} \left( \frac{2}{(n-1)} \right) = 0.$$

As a consequence, postal services are an integral part of the daily commercial activities (cf. Dietl and Trinkner, 2009).<sup>8</sup> It can be assumed that this transaction cost argument is resolved by market forces (by postal operators) wherever the consumers' reductions in transaction cost exceed the cost of service provision.

Crew and Kleindorfer (1998) go one step further and argue that uniform pricing regulations might yield further reductions in transaction costs that are otherwise not achieved by the market. Uniform prices can reduce uncertainty for senders and allow higher efficiency in mail collection and processing. If the reduction in transaction costs is higher than the welfare losses eventually caused by uniform pricing,<sup>9</sup> uniform pricing is optimal and should be included in the USO for those market segments where a deregulated market is expected to lead to (or enforce) price differentiation (e.g. because of entry in low-cost delivery areas).

### 3. Economic rationale of the postal USO

As a consequence of the two-sidedness of the postal market, the USO can be analyzed along the three dimensions that are illustrated in Figure 2.

Relevant *sender-specific features* include the opportunity cost for sender  $S$  to reach postal services at the point of access  $A_S$  (e.g. post office, agency, online), the availability of services and opening hours in  $A_S$ , and availability of online solutions and ability of  $S$  to use them. In analogy, the *recipient-specific features* are the opportunity cost of receiver/recipient  $R$  to reach postal services at the point of access  $A_R$  (e.g. mail box, post office, P.O. box, electronic inbox), the availability of services and time of delivery at  $A_R$ , and the availability of online solutions and ability of  $R$  to use them. The third dimension is characterized by the *services* provided by the platform to link the sender and recipient

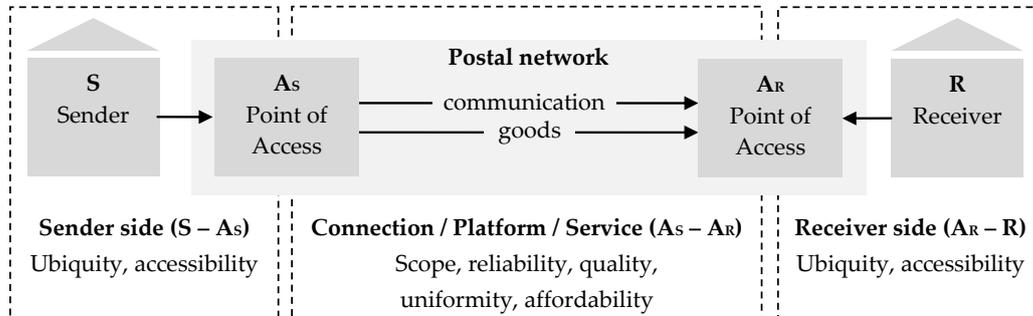
<sup>8</sup> As a consequence, most empirical studies on this matter have shown a strong, often close to 1:1 relationship between GDP and overall letter volumes. Trinkner and Grossman (2006) show that despite e-substitution, the relationship still holds true in Switzerland.

<sup>9</sup> In perfectly competitive markets, uniform pricing constraints always decrease welfare. However, as we have seen above, this is not necessarily the case in the postal market as there are important deviations from perfect markets, e.g. externalities.

sides ( $A_S - A_R$ ). Of relevance are the basic products offered (e.g. letters, parcels) including their specific features (e.g. end-to-end speed, reliability, price, value added services).

In analogy, the same analytical distinction can be made for telecommunications services.

**Figure 2: USO elements in the two-sided market approach**



Source: Based on Jaag and Trinkner (2011c)

The USO candidates developed in Section 2 can be assigned to these three dimensions as illustrated in Figure 2. Ubiquity and accessibility are of concern for the sender and recipient side. Important characteristics of the platform (the service between the sides) include the scope of services (e.g. letters, parcels, registered items), reliability, quality, uniformity, and affordability.

In this context, an “economic rationale of the USO” that precludes any potential market failure as discussed in Section 2 would read as follows:

*“Ensuring standard services (“uniform”) for the delivery of written communication and goods (“scope”) that enable everybody in the economy to reach everybody else (anybody connected as sender and recipient, “ubiquity”) under reasonable accessibility (no large effort to use the service as sender or recipient, “accessibility”) within a reasonable timeframe (for example next day, “quality”) on a reliable basis (one must know that the recipient indeed receives the items sent, “reliability”) at affordable rates (the cost should not exclude from consumption, “affordability”).”*

Such a view is similar to the one behind the EC postal directive and is supported by the results from Rohr et al. (2012) which measure consumer preferences based on discrete choice experiments.

A crucial question is whether the potential market failures discussed above are likely to be present in the postal sector in the future. In particular, some of the economic needs might be fulfilled sufficiently by electronic alternatives. Wherever the market is likely to satisfy the needs satisfied by the USO, sector-specific regulation should fade out or turn inoperative. Given the “digital revolution”, changes of the need to regulate postal universal services are likely. In the remainder, we investigate the impact of such electronic alternatives and derive an outline of a sector-overlapping USO.

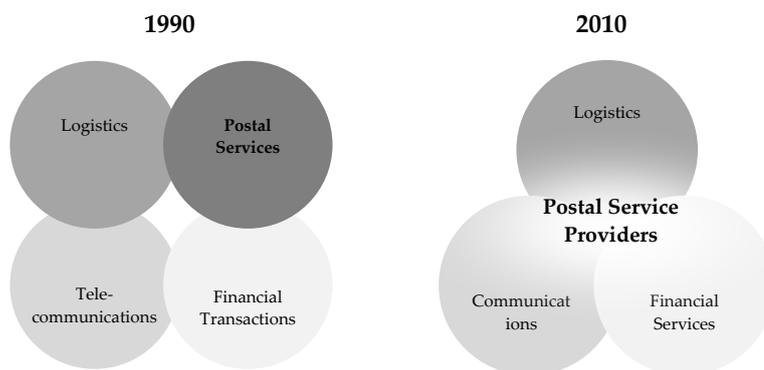
#### 4. The emergence of “universal” substitutes

The digitalization trend of the past decades has resulted in a number of new technologies allowing letters to be increasingly replaced and substituted. Written communication takes place in digital media while letters have seen their peak in most industrialized countries.<sup>10</sup>

##### Convergence of the postal and telecommunications sectors

One can argue that the postal market and the telecommunications market are converging and that e-substitution is a reflection of letter mail’s loss in market share in the communications market. Figure 3 illustrates the structural change of the postal industry due to the convergence of transaction-based markets.

**Figure 3: Evolution and convergence of (transaction) markets**



Source: Dietl et al. (2011)

Whether telecommunications markets provide viable, “universal” substitutes for postal services depends on the universal availability of these substitutes. In the case of electronic substitutes, this is the topic of universal service regulation in the telecommunications sector. In the European Union, rules on universal service in electronic communications emerged in the context of full market opening.<sup>11</sup> Similarly to the postal sector, the rationale of the telecommunications USO is to act as a social safety net where market forces alone do not deliver affordable access to basic services for consumers. In order to achieve availability, affordability and accessibility, one or more designated operators can be obliged to deliver universal services. Member States must ensure that all end-users have access at a fixed location to voice and data communications, including ‘functional internet access’. The USO is neutral as to the technology by which the services can be provided. While the USO in 2002 limited ‘functional internet access’ to narrowband data rates, the Telecom Package in 2009 allows Member States to define the data rates at national level, which may include broadband speeds.<sup>12</sup> Currently, only, Finland, Spain and Malta have adopted legislation to include broadband in national USO.<sup>13</sup>

With respect to coverage with broadband services, it is not quite clear what the policy objective is: Is it the availability of broadband to subscribers – the percentage of households, for example, that have access to broadband – or the actual use, or percentage of households that subscribe to the

<sup>10</sup> See Trinkner (2009) for the historic development of mail volumes in Switzerland since 1900.

<sup>11</sup> Directive 2002/22/EC.

<sup>12</sup> Recital 5 of the Citizens’ Rights Directive (CRD), OJ L 337, 18.12.2009.

<sup>13</sup> Non-European examples would include Switzerland (since 2006).

service? With voice telephone service, this distinction was mute because service was both universally available and universally purchased. With broadband, though, the distinction is relevant. Even though broadband connections are not generally part of the USO in the EU, 70% of households now have internet access and 61% have a wired or wireless broadband connection. Broadband usage rates vary considerably between Member States, however. Broadband take-up ranges from 23% of households in Romania and 26 % in Bulgaria to 80% in the Netherlands and Denmark and 83% in Sweden.<sup>14</sup>

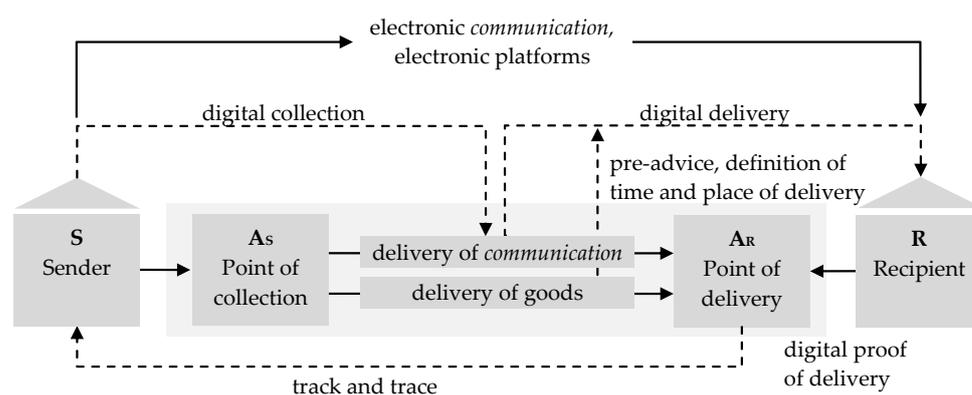
Hence, to the extent that broadband connections are available to customers, there are now two platforms for written communication in the form of the postal network and the internet. They meet different needs but are increasingly converging: technical processes are being created which make e-mails more secure and confidential – just like a sealed letter or even registered mail.

### Scope and limitations of new digital means

Recalling the analysis of externalities above, new digital means resulting in platform competition between physical and digital means are likely to change the economic need for internalizing externalities by USO policies. For example, registered mail might diminish in value to the society when electronic alternatives like digital signatures (a) have been implemented in the legal framework and (b) have succeeded in the market. While some USO elements may be of decreasing value, others may become more valuable to society. Examples are the delivery of parcels because of online shopping or the role of postal services as “transformers of last resort” (cf. Dietsch and Trinkner, 2009). Similarly, new combinations of physical postal services with new digital means will allow for selected adjustments of the postal USO. Potential candidates are, among others, electronic collection of letters (that are later printed out and delivered physically) or electronic/hybrid delivery of letters (scanning, instantaneous electronic delivery, weekly physical delivery of scanned mail).

Figure 4 illustrates the platform competition in the delivery of communications (substitutes, dotted arrows) as well as new digital means that can improve traditional postal services.

**Figure 4: Substitutes and complements in the delivery of communication and goods**



Source: Jaag and Trinkner (2011c)

Table 1 presents an indicative, non-exhaustive list of the new digital means (column 4) and complements (column 3) against potential evolutions of physical means (column 2).

<sup>14</sup> European Commission (2012)

**Table 1: New means to provide universal services**

Economic Rationale	New physical means	New digital complements	New digital substitutes
<b>Sender</b>			
Ubiquity	–	“Territorial neutrality”	“Territorial neutrality”
Accessibility	Modern customized collection points, 3 <sup>rd</sup> party collection, pick-up	Online solutions, mobile solutions	Online solutions, mobile solutions
<b>Recipient</b>			
Ubiquity	–	Recipients without physical address, virtual recipients	Recipients independent of physical address, virtual recipients, multiple addresses
Accessibility	Centralized mail boxes, customized and variable delivery locations <sup>15</sup>	Digital inboxes <sup>16</sup> , tracking services	Online solutions, mobile solutions
<b>Connection</b>			
Scope	–	Added value services, electronic services	Limited to communication in general
Quality	Improvement in Quality of Service	Electronic pre-delivery <sup>17</sup>	Instantaneous delivery
Reliability	Guaranteed delivery	Tracking services for letters <sup>18</sup> , digital signatures from recipients, personal permanent address <sup>19</sup>	Digital identities, digital signatures, fully encrypted communication, 100% reliability
Affordability	Competitors	Depending on avoided cost in physical delivery	Low to zero cost

Source: Jaag and Trinkner (2011c)

The 3<sup>rd</sup> column of Table 1 indicates that digital substitutes for postal services are limited to communication. In other words, regardless of the digital revolution, delivery of physical goods will remain important. The second column shows that there are important digital complements to traditional postal services that can be used to fulfill the economic rationale of the USO. As a consequence, it is likely that the current definition of the postal USO will have to face a change in the near future.

## 5. Defining an intermodal USO

Given increasing convergence of postal and telecommunications markets and the availability of viable substitutes for postal services, there may be an opportunity to redefine USO in order to reduce their burden<sup>20</sup> on operators and the economy as a whole.<sup>21</sup>

### Intermodal definition and/or financing of the USO

Maegli et al. (2010) propose a “unified approach” to regulate universal services in posts and telecommunications. Such an approach would consist of a jointly defined universal service obligation and corresponding regulation, together with a separated, sector-specific regulatory regime for monopolistic bottleneck resources and interconnection issues. This framework would be consistent

<sup>15</sup> E.g. Pick-Post, a means by Swiss Post where recipients can flexibly chose their delivery location.

<sup>16</sup> E.g. eBoks, NetPosti.

<sup>17</sup> E.g. Swiss Post Box.

<sup>18</sup> E.g. „A-Post Plus“ from Swiss Post.

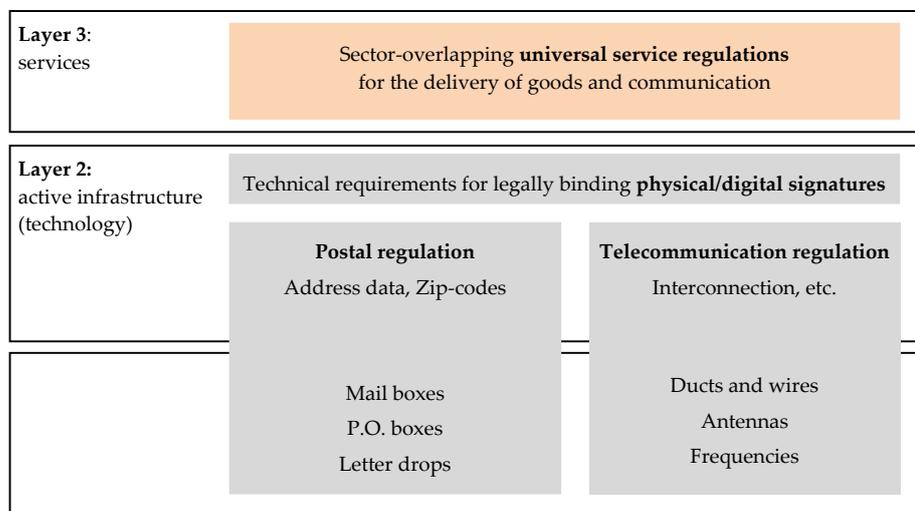
<sup>19</sup> Generic, unique address that follows recipient worldwide and throughout its life.

<sup>20</sup> See Jaag (2011) for a discussion of the burden of the USO on the USP.

<sup>21</sup> See Dietl and Jaag, 2011.

with the layer-oriented framework often applied in the telecommunications market (“disaggregate approach”, see Knieps, 2002). Figure 5 is inspired by these approaches.

**Figure 5: Sector-specific regulation in converging markets**



Source: Based on Maegli et al. (2010)

The scope of intermodal universal service regulations in Layer 3 includes two separate dimensions.

*Intermodal definition:* Universal services can be defined jointly. The possibilities range from an application of joint principles up to a purely technology neutral definition that covers both sectors simultaneously.

*Intermodal financing:* Similarly, the USO financing (designation, financing mechanisms and/or costing) can be aligned, e.g. by application of joint standards<sup>22</sup> or a replacement of sector-specific solutions by a single, sector-overlapping financing mechanism<sup>23</sup>.

The first dimension, the definition of an intermodal USO, is discussed below exemplarily based on a set of generic principles and assumptions on future consumer preferences. Selected issues of intermodal financing issues are discussed in Trinkner et al. (2012).

### Generic principles for the definition of universal services

Given our economic foundation of the postal USO and the principles as discussed in Jaag and Trinkner (2011b), any realignment of the USO should be based on the following principles:

*Output-orientation:* Focusing on customer needs. Viewing postal operators as companies transforming inputs (labor, capital/infrastructures, energy) into outputs (mail items collected and delivered), obligations should tie to outputs rather than inputs. An example of an input-regulation would be a minimum number of traditional post offices or frequency of delivery. Instead, regulations should be output-oriented and describe accessibility of services or speed of service (e.g. next day excluding Sunday).

<sup>22</sup> For example, the EC applies the net cost methodology both in the postal and telecommunications sector.

<sup>23</sup> Historically, many countries provided posts and telecommunications with the same company and thereby applied sector-overlapping financing mechanisms through intra-company cross-subsidization. For example, Swiss postal services were heavily subsidized by telecommunication services prior to 1998 when the former PTT was broken up into Swiss Post and Swisscom.

*Technological neutrality:* Output-regulations should be defined independently of the technology applied. Regulations should not be linked to a particular technology. Rather, output-regulations should be aligned to the consumers' needs.

*Product neutrality:* The output-regulations should be formulated in a rather generic way in order to allow the universal service provider to amend its product portfolio over time. Hence, product-specific obligations (e.g. "first class mail") should be avoided.

*Necessity:* Universal services are to be defined as a basic service addressing the most basic needs of the consumers ("safety net"). On top of these basic services, universal service providers (or their competitors) will be able to provide value added services on a purely commercial basis.

*Viability:* The obligations should be defined in a viable way in order to avoid an excessive external financial need to compensate for the cost of the USO.

*Competitive Neutrality:* Last but not least it is important to define, designate and compensate universal services competitively neutral to avoid inefficient market equilibria.

Universal services that are defined in such a way would implicitly account for changing market conditions and the impact of new substitutes.

### **Assumption on long term consumer needs**

The necessity to adapt the current USO crucially depends on the underlying needs of citizens, companies and governments in the long-term. A sound analysis is beyond the scope of this paper. We therefore hypothesize as follows:

- (1) People will continue to send letters and parcels, read newspapers and make phone calls;
- (2) People will do this in increasingly diverse ways, using a greater variety of suppliers and platforms.

Based on these two hypotheses and against the technical developments in the telecommunications sector<sup>24</sup> we assume that in the future, two basic connections will be able to cover the whole range of long-range interaction needs between consumers.

*Physical connection:* A reliable, affordable, if necessary traceable delivery for addressed items of all kind.<sup>25</sup> Such a delivery service can be used for letters, newspapers and parcels likewise.

*Digital connection:* An instantaneous, safe communication channel from anywhere to anywhere with a bandwidth that allows for bi-directional conversation in high quality. Such a connection can be used for letters, newspapers and phone calls equally.

In line with our conclusions in Chapter 4 we therefore reject the more radical view that a universal service for physical services can be substituted entirely by a communications USO. It will however be in the hands of the consumer which connection she chooses to send a letter or receive a newspaper. These two connections will lie at the heart of the intermodal USO presented below.

### **A stylized intermodal USO**

Considering the economic foundations earlier on, the postal and telecommunication services serve primarily to reduce transaction costs. Secondarily, the highest utility will be achieved if the network

---

<sup>24</sup> Cf. Trinkner et al. (2012) for a discussion.

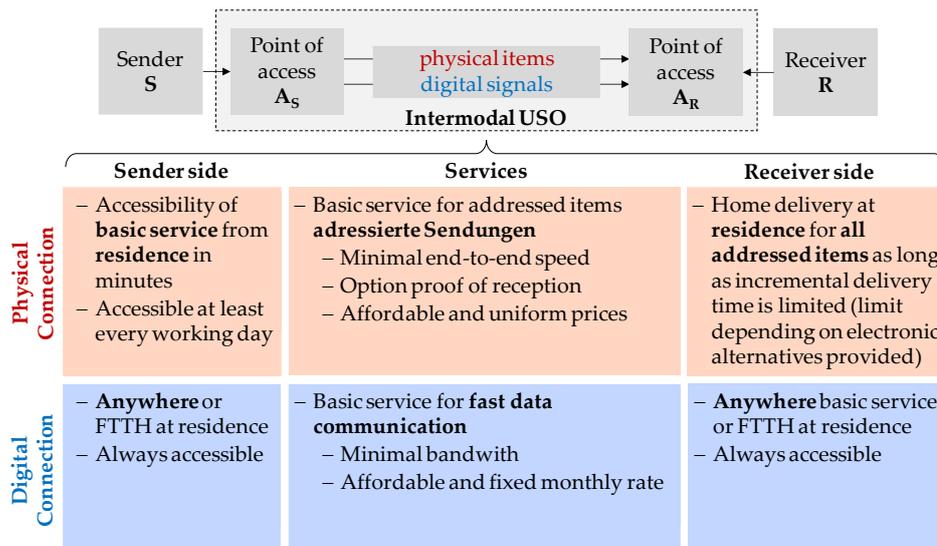
<sup>25</sup> Or as expressed by Hearn (2012): „things“ (rather than letters).

connects all citizens and organizations at uniform prices to exploit network effects optimally. A jointly defined intermodal USO should therefore

- (1) secure a set of basic services at affordable prices for the transport of physical items and digital signals (to reduce transaction costs); and
- (2) ensure that every natural or legal person be connected to the service as a sender and recipient (to exploit network effects).

Based on these requirements and the generic principles and assumptions from above, a future-oriented intermodal USO can be outlined as illustrated in Figure 5.

**Figure 6: Example of a stylized intermodal USO**



For the physical connection, the intermodal universal service requires at least one operator to offer a basic service for addressed items of all kind that ensures compliance with a set of obligations that are related to speed, reliability, affordability and uniformity<sup>26</sup> (“basic requirements”). Those products that are necessary to achieve compliance with the USO requirements are then implicitly the regulated ones. Products that differ in at least one dimension are not regulated. For example, a product with non-uniform pricing or very slow speed of delivery would not be regulated.

On the sender side, the regulation of collection is limited to the nationwide accessibility (average time to reach from residence) and availability (opening hours) of the basic services. Thereby, no particular form of collection is presumed (e.g. post offices) to enable customer-friendly adaptations of the postal network over time including online solutions where this is feasible.

On the recipient side, the standard mode of delivery remains home delivery for all addressed items (not limited to basic services as opposed to the sender side) up to a certain time ceiling of incremental delivery cost. Whether the associated cost for the USP is appropriate and deviations from home delivery are allowed depends on the electronic alternatives provided. Daily delivery is not required explicitly. It may be required implicitly however where it is necessary or optimal to meet the requirements that the postal platform must satisfy for the “basic services”. For example, daily delivery

<sup>26</sup> In terms of regional differentiation, not format.

would be necessary where these requirements include demanding speed requirements such as J+1, while J+3 may make it optimal to deliver every second or third day only.

For the digital connection, the intermodal universal service requires that at least one operator offers a fast bi-directional data transmission of a certain minimal bandwidth at a fixed rate. The minimal bandwidth should allow for IP telephony, better HD or video telephony. Such a basic data service would enable telephony but would not prescribe it directly. Hence, operators could continue their traditional (analog) offers but would not need to.

On the sender and receiver side, accessibility would – in contrast to the physical connection – not be limited to the residence. Rather the person itself would need to be accessible independently of its position. Alternatively, the receiver could choose a wired broadband connection at its residence with a higher bandwidth (e.g. HD-video telephony). In turn it would lose the right to purchase the standard (mobile) basic offer.

### Remarks

As a consequence of the convergence of the postal and telecommunications sector (see Figure 3), such an intermodal universal service can be seen as a universal service for “logistics and communication” (rather than for post and telecommunications). Whereas the logistics part of the USO is tied to the residence of a person, the communications part follows the person where it actually is at the moment. This distinction can be justified based on different speed requirements. In contrast to electronic communication that requires very fast, instantaneous data transmission to the place where the person actually is, the speed of postal delivery is measured in days which makes it efficient to determine a standard delivery place (the place where a person usually is), ensuring optimal exploitation of economies of scale, density and scope as well as a connection to every relevant residence.

In such a framework, the main role of regulators will be to control whether there are facilities and services offered by the market players that lead to compliance with a set of clearly defined criteria that relate on the one hand to accessibility and availability on the sender and receiver sides and on the other to the basic service requirements of the two platforms. As long as all requirements are met by one or more market players, the service providers are free to determine their product range and adapt it over time to the changing needs of consumers. In case of an impending under-provision however, a pre-defined allocation mechanism should step in.<sup>27</sup>

Depending on the practical implementation of the intermodal USO discussed earlier, there may be substantial potentials to achieve recurring savings on the postal side, e.g. through the reduction of delivery days or coverage. On the other hand, the one-off investment costs for a nationwide fast broadband network are significant. In this context, Trinkner et al. (2012) discuss the financing opportunities for the case of Germany. In particular, they ask to what extent adjustments in the postal USO could contribute to a better financial position of postal universal service providers and how large are these savings would be compared to the cost of building a FTTH network in the same regions. The calculations indicate that the postal savings potentials are substantial and may even exceed the one-off cost of building a FTTH network in very rural areas.

---

<sup>27</sup> For example competitive tendering or direct allocation (cf. Calzada et al., 2010 for a discussion). For a treatment of competitive effects of different financing mechanisms cf. Gautier et al. (2012) or Jaag and Trinkner (2011a).

## 6. Summary

In this paper we have discussed the idea of an intermodal definition of universal service obligations in post and telecommunications.

The primary role of postal and telecommunications services in the economy is the reduction of transaction costs. The regulation of universal postal services can be motivated by redistributive aims or, alternatively, as a policy to mitigate market failures, notably in the context of network externalities in the two-sided postal market. Based on these potential market failures we have derived an economic rationale of the USO that can be summarized as ensuring ubiquity and accessibility for senders and recipients for a postal platform that provides a set of basic services which are of quality, reliable, affordable and uniform.

A crucial question is whether these sources potential market failures are likely to be present in the postal and telecommunications sector in the future. In particular, some of the economic needs might be fulfilled sufficiently by more recent electronic alternatives. The digitalization trend of the past decades has resulted in a number of new technologies allowing letters to be increasingly replaced and substituted. To the extent that broadband connections are available to customers, there are now two platforms for written communication in the form of the postal and the telecommunications networks. They meet different needs but are increasingly converging: technical processes are being created which make e-mails more secure and confidential – just like a sealed letter or even registered mail.

This convergence does not affect the entire postal market. Digital substitutes for postal services are limited to communication. In other words, regardless of the digital revolution, delivery of physical goods will remain important. There are however important digital complements to traditional postal services that can be used to fulfill the economic rationale of the USO. As a consequence, it is likely that the current definition of the postal USO will have to face a change in the near future.

Against these technical developments and the hypothesis that persons will continue to communicate and exchange goods with each other we have developed the assumption that in the future, two basic connections will be able to cover the whole range of long-range interaction needs between consumers: A physical and a digital one. Based on this assumption and the analysis of the economic rationale of the USO earlier on we have finally outlined an intermodal definition of a future USO that follows six generic principles: output-orientation, technological neutrality, product neutrality, necessity, viability, and competitive neutrality. Such an intermodal USO would consist of two basic services. The first one is a physical delivery service for items of all kind meeting certain speed, reliability, affordability and uniformity requirements. The second one is a fast broadband service at an affordable, fixed rate. While the first service would require good accessibility and availability measured from the point of residence, the second service would need to be available everywhere. The financial calculations indicate that savings on the postal side may offset one-off costs of

## 7. References

- Arrow, K. "The organization of economic activity: Issues pertinent to market versus non-market allocation," The Analysis and the Evaluation of Public Expenditure: The PPBS System, Congress Joint Economic Committee, Washington D.C., 47-64, 1969.
- Calzada, J. ; Jaag, Ch. ; Trinkner, U. ; (2010). "Universal Service Auctions in Liberalized Postal Markets". In: Heightening Competition in the Postal and Delivery Sector. Crew, M.A. and Kleindorfer, P.R. (eds), pp. 263-277
- Coase, R.H. (1960). "The Problem of Social Cost". In: *Journal of Law and Economics*. Vol. 3 (1960), S. 1–44.

- Cremer, H.; De Donder P.; Boldron F.; Joram D.; Roy B. (2008). Social costs and benefits of the universal service obligation in the postal market. In: M. A. Crew and P. R. Kleindorfer (eds.), *Competition and Regulation in the Postal and Delivery Sector*. Cheltenham, UK; Northampton, MA, USA, 23-35.
- Cremer, H.; Gasmi, F.; Grimaud, A.; Laffont, J.J. (2001) "Universal Service: An economic perspective", *Annals of Public and Cooperative Economics* Volume (1), 5-43.
- Crew, M.A.; Kleindorfer P.R. (1998). "Efficient entry, monopoly and the universal service obligation in Postal Service," *Journal of Regulatory Economics*, 15, 103-125
- Crew, M.A.; Kleindorfer P.R. (2002). "Regulatory Economics: Twenty Years of Progress", *Journal of Regulatory Economics* 21(1): 5-22.
- Dietl, H.; Jaag, C. (2011). Postal and Regulatory Reform in Intermodal Competition, in: *The Future is in the Post Vol. 2: Perspectives on Transformation in the Postal Industry*, ed. by K. Sund and D. Osborn, Faringdon. Libri Publishing.
- Dietl, H.; Jaag, C.; Trinkner, U. (2010). *Postal Regulation and Business Model Transformation*, presentation given at the TIP Conference 2010, Lausanne.
- Dietl, H.; Jaag, C.; Trinkner, U. (2011). *Reform des Postsektors in der Schweiz: Eine Standortbestimmung / La réforme du secteur postal en Suisse: état des lieux*, *Die Volkswirtschaft* 04-2011, 43-46
- Dietl, H.; Trinkner, U. (2009). El desarrollo de servicios postales universales en América Latina: una perspectiva económica. In: Calzada, J; Costas, A; Jordana, J. *Más allá del mercado. Las políticas de servicio universal en América Latina*. Barcelona, 377-406.
- European Commission (2011). Universal service in e-communications: report on the outcome of the public consultation and the third periodic review of the scope in accordance with Article 15 of Directive 2002/22/EC.
- Gori, S. ; Lettieri, C. ; Marè, M.; Visco Comandini, V. (2002). *The myth of the uniform price*. Paper presented to the International Conference on Public Finance, Helsinki, August 29-31.
- Jaag, C. (2011). What is an Unfair Burden? Compensating the Net Cost of Universal Service Provision, *Review of Network Economics* 10(3), Article 7.
- Jaag, C.; Trinkner, U. (2008). Pricing in competitive two-sided mail markets. In: in M. A. Crew and P. R. Kleindorfer (eds.), *Competition and Regulation in the Postal and Delivery Sector*. Cheltenham, UK; Northampton, MA, USA, 136-149.
- Jaag, C.; Trinkner, U. (2011). The future of the USO – Economic rationale for universal services and implications for a future-oriented USO. *Swiss Economics Working Paper*.
- Jaag, C.; Trinkner, U. (2011a). The interaction between universal service costing and financing in the postal sector: a calibrated approach. *Journal of Regulatory Economics*, 39(1):89-110.
- Jaag, C.; Trinkner, U. (2011b). "A General Framework for Regulation and Liberalization in Network Industries", forthcoming in M. Finger and R. Künneke (eds.), *International Handbook of Network Industries – The Liberalisation of Infrastructure*, Cheltenham. Edward Elgar.
- Knieps, G. (2002). "Does the System of Letter Conveyance Constitute a Bottleneck Resource?" In G. Kuhlenkamp and A. Niederprüm (eds.), *Contestability and Barriers to Entry in Postal Markets*. Rheinbreitback: WIK, pp. 9-22.
- Maegli, M.; Jaag, C.; Koller, M.; Trinkner, U. (2010). Postal Markets and Electronic Substitution: What is the Impact of Intermodal Competition on Regulatory Practices and Institutions? *Competition and Regulation in Network Industries*, 11(4):382-397.
- Mas-Colell, A.; Whinston, M.; Green J. (1995). *Microeconomic Theory*, Oxford University Press.

- Panzar, John C. (2006). *PO box access: competition issues in a two-sided postal market*, Presented in Toulouse at the 4th IDEI/La Poste Conference on Regulation, Competition and Universal Service in the Postal Sector.
- Riordan, M. (2001). "Universal residential telephone service". In: M. Cave, S. Majumdar and I. Vogelsang (eds), *Handbook of Telecommunications Economics*, Amsterdam: Elsevier Science.
- Rochet, J.-C.; Tirole, J. (2006). "Two-sided markets: A progress Report", *The RAND Journal of Economics*, 35(3): 645-667.
- Trinkner, U. (2009a). *Regulating the Mail Market: Main Regulatory Challenges in light of Universal Service Provision, Competition, and E-Substitution*. Saarbrücken. ISBN 978-3-8381-0788-2.
- Trinkner, U. (2009b). "*Shaping the USO? An Outline of Thought from an Economic Perspective*", presentation held at the IPC Senior Executive Forum on Regulation, October 2009.
- Trinkner, U.; Grossmann, M. (2006)
- Trinkner, U.; Holznagel, B.; Jaag, C.; Dietl, H.; Haller, A. (2012) Möglichkeiten eines gemeinsam definierten Universaldienstes aus ökonomischer und juristischer Sicht. Forthcoming.
- Willig, R.D. (1979). "The theory of network access pricing". In: H.M. Trebing, ed., *Issues in public utility regulation*, Michigan State University Public Utilities Papers.