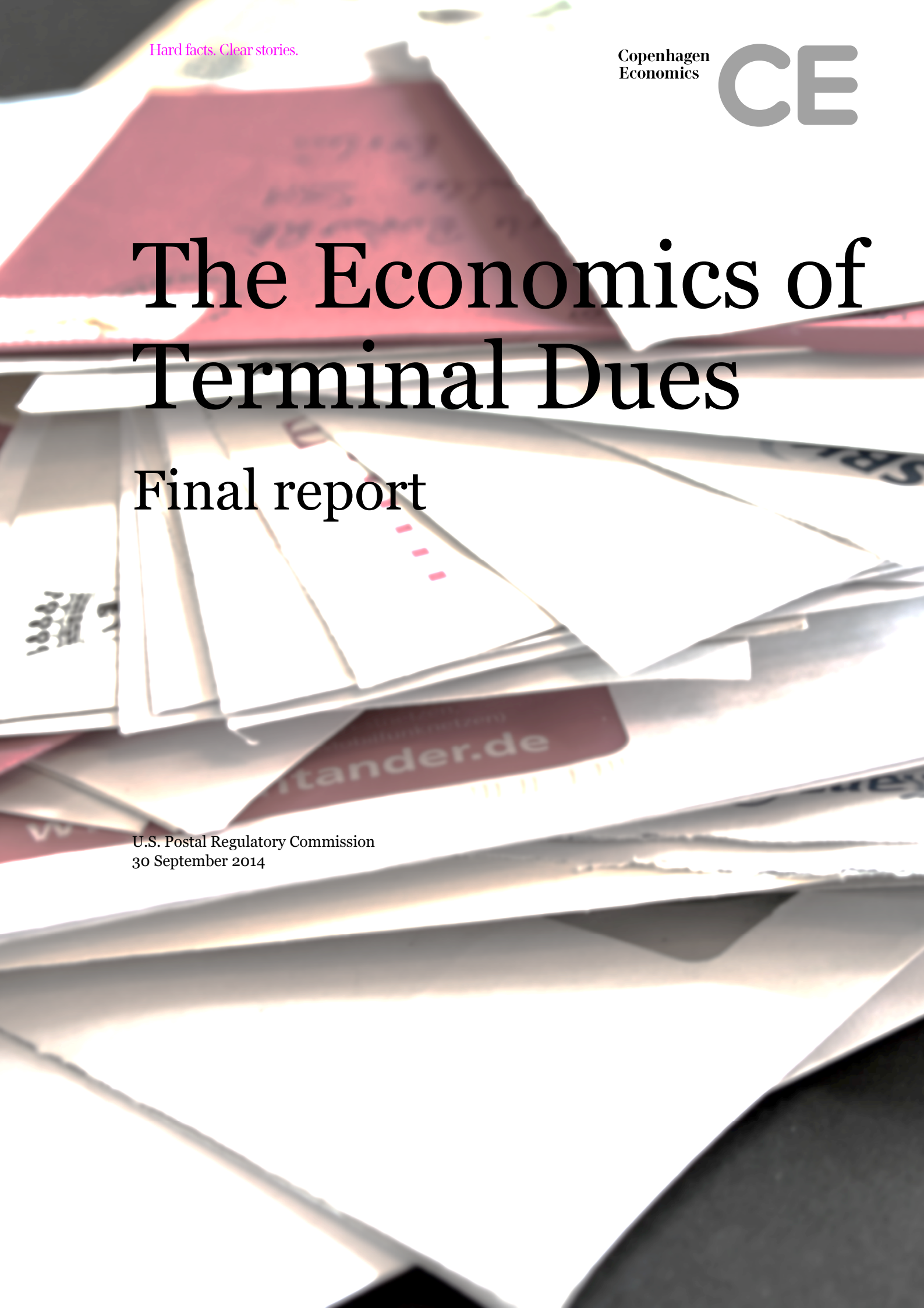
Hard facts. Clear stories.

Copenhagen Economics



The Economics of Terminal Dues

Final report

U.S. Postal Regulatory Commission
30 September 2014

Authors:
Henrik Ballebye Okholm
Anna Möller Boivie
Nina Russell
Jacek Przybyszewski

Preface

The Universal Postal Union (UPU) system of terminal dues governs payments between designated postal operators for the transport, sorting, and delivery of cross-border letter post items[1] in the destination country. UPU rates are used by many postal operators across the world, both directly and indirectly (as a fall-back provision).

Previous research has raised concerns that the current UPU terminal dues system may be problematic. Problems highlighted primarily relate to five areas: (i) distortion of competition, (ii) insufficient compensation for delivery of inbound letter mail creating financial transfers between postal operators, (iii) distortion of international mail flows due to arbitrage, (iv) inefficient foreign aid, and (v) distortion of competition between retailers in the domestic market and markets abroad and between retailers in developing and industrialised countries.

While there has been some work estimating the potential magnitude of distortions related to insufficient compensation for inbound letter mail, no one has yet analysed the wider effects of the terminal dues system through the lens of economic theory.

Against this background, the U.S. Postal Regulatory Commission has asked Copenhagen Economics to analyse the system of terminal dues from the perspective of economic theory. The output of the analysis should respond to the following five questions:

- Are the problems arising from the current terminal dues system and highlighted in earlier research real from an economic theory perspective, and are there other problems?
- Do bilateral or multilateral agreements cause the same or different problems?
- What system of terminal dues would (in theory) solve the problems identified, without distorting letter markets and the larger global market?
- What is the practical solution to the identified problems given the different levels of economic development in UPU member countries?
- What is the most suitable framework for measuring the market distortions arising from the current terminal dues system?

This report presents the findings of our research conducted between June and September 2014. Along the way, we have benefitted from input and feedback from several market experts, including our subcontractors from Ipostes, Jacob Johnsen and Walter Trezek.

The structure of the report is the following: Chapter 1 provides an introduction to terminal dues, outlines the distortions highlighted in previous research, and presents the methodology for our work. Chapter 2 contains our analysis of existing systems for terminal dues and the potential distortions created. Chapter 3 discusses the underlying drivers for the identified distortions and proposes a new system that would eliminate the identified distortions. It also discusses the practical and political considerations that may

[1] For a definition of letter post, see Box 1

prevent the implementation of the proposed solution and proposes a practical solution to cope with these concerns. Finally, chapter 4 proposes a two-step framework for assessing the likelihood, significance, and magnitude of distortions.

Table of contents

List of tables

List of figures

List of boxes

Executive summary

The current system of terminal dues administered by the Universal Postal Union (UPU) has been criticized for being problematic. A review of existing literature[2] reveals five issues, highlighted as problems related to the current structure of UPU terminal dues:

- Distortion of competition for first-mile and last-mile activities[3];
- Distortion of international mail flows, especially relating to remail;
- Inefficient foreign aid;
- Creation of financial transfers between designated postal operators;
- Distortion of competition between retailers in the domestic market and markets abroad and between retailers in developing and industrialised countries

The U.S. Postal Regulatory Commission has asked Copenhagen Economics to assess whether the issues outlined above constitute real problems from the perspective of economic theory, and whether the UPU terminal dues cause other problems. We have also been asked to provide suggestions for how the problems identified can be remedied and how the magnitude of the problems can be measured.

Our analysis reveals that the issues identified in previous literature sometimes, but not always, constitute real problems from the perspective of economic theory as they create distortions of total welfare. In particular, we find that the application of different terminal dues to designated and non-designated operators distort competition among first-mile delivery operators, that is, service providers who compete for the business of the original senders (or shippers) of mail. We also find that terminal dues set at a level below the cost of last-mile activities distort competition among last-mile operators, that is, service providers who compete for intercity transport, sorting, and delivery of mail in the destination country.[4] In addition to this, we find that the current system of terminal dues increases demand for delivery services covered by the system relative to services outside the system. This leads to excessive use of packet delivery services at the expense of parcel delivery services.[5] The structure of current terminal dues also leads to distortions in mail and trade flows by increasing demand for less efficient cross-border delivery of letter post[6] (including packets), especially from certain countries. Finally, we find that terminal dues create financial transfers between delivery operators which, in turn, may cause distortionary spill-over effects (e.g., higher taxes to fund postal operators' losses).

Our analysis reveals that alternative systems like REIMS and bilateral agreements create many of the same distortions as the UPU system. We argue that an optimal and non-distortionary solution would require that terminal dues (i.e., the price for last-mile han-

---

2 For a list of the 49 publications reviewed and the result of the screening, see Annex A3.

3 "First-mile activities" involve the sale to the original sender or shipper, collection in the country of origination, and transport (directly or by contract) to the country of destination from the origination country. "Last-mile activities" refer to intercity transport (if required), sorting, and delivery in the destination country.

4 Terminal dues higher than the costs are not likely to lead to distortions because operators can enter bilateral agreements to avoid too high prices.

5 Definitions of packet delivery and parcel delivery are provided in Box 1.

6 A definition of "letter post" is provided in Box 1.

dling of *cross-border* letter post items) are set equal to the price for last-mile handling of *domestic* (and comparable) letter post items, adjusted for any cost differences between domestic and cross-border letters. In order to cope with political concerns, this solution could be complemented with an aid program for developing countries.

In order to measure the magnitude of the identified distortions, we propose a two-step framework consisting of an initial screening where the likelihood and significance of different distortions are assessed and a subsequent quantification of the most significant distortions by means of economic modelling.

Identifying distortions created by terminal dues

In accordance with economic theory[7], prices have an important signalling function in all markets. For competitive markets to work, all economic agents (consumers and producers) must respond to appropriate price signals. Market failure occurs when the price signals incentivise agents to make decisions that lead to a loss of economic and social welfare. This happens when the additional benefits received by consumers from consumption of an additional unit of a product or service do not equal the marginal costs of producing another unit of that product or service. In economics terms: The marginal social benefit of consumption does not equal the marginal social cost of production.

To analyze economic distortions created by existing terminal dues systems, we apply a value chain approach where we analyze the journey of a cross-border letter[8] from sender to recipient. For each step of the value chain, we present key decision makers, decisions made, how decisions are affected by terminal dues, and how the influence of terminal dues in turn produces market distortions.

By determining the prices that designated postal operators pay each other for last-mile handling of cross-border letter post items, terminal dues may distort price signals and influence decisions throughout the value chain. Terminal dues will have a direct impact on the decisions made by last-mile operators (what prices and conditions to offer for last-mile activities) and first-mile operators (which delivery operator to engage with). If low terminal dues spill over to low prices paid by senders for cross-border delivery, terminal dues may also have an indirect impact on the decisions made by senders (such as the decisions of which delivery operator to engage with and where to inject items) and recipients (e.g., from which country to order items online).

Distortions created by the current UPU system for terminal dues

By incentivising designated postal operators to discriminate between (i) letter post items of domestic and cross-border origin and (ii) letter post items delivered by designated and non-designated delivery operators when setting the prices for similar or identical last-mile delivery services, the UPU terminal dues system creates six types of market distortions:

- Distortion of competition for last-mile handling of cross-border letter post items

[7] See for example Varian (2002), Intermediate Microeconomics, p. 562

[8] In order to ensure a broad and representative coverage of our analysis, we conduct the analysis for three types of letter mail: (i) business-to-consumer packets, such as e-commerce and mail order packets, (ii) bulk mail letters, such as direct mail or transactional bulk mail, (iii) single piece letters, such as birthday cards and postcards.

- Distortion of competition for first-mile handling of cross-border letter post items
- Distortion of demand for delivery within and outside the terminal dues system
- Distortion of demand for domestic vs. cross-border delivery
- Distortion of demand for cross-border delivery originating in transition vs. target countries
- Financial transfers between delivery operators[9]

First, terminal dues may distort competition for last-mile handling of cross-border letter post items. This is the case when the terminal dues paid to the last-mile designated operator is so low that an as-efficient delivery operator cannot compete with the designated operator for last-mile handling of cross-border items. Distorted competition may hurt consumers in terms of reduced innovation which may lead to higher prices and lower quality of service in the long run.

Second, terminal dues may distort competition for first-mile handling of cross-border letter post items. Because terminal dues are only available to designated operators, non-designated operators have a competitive disadvantage (paying a higher price for last-mile activities in the destination country). In practice this could, for example, mean that a global integrator and competitor to the designated postal operator cannot offer competitive prices for a service where it collects and transports letters from the United States to the destination country for further last-mile handling by the local designated operator[10]. Similar to the case of last-mile activities, distorted competition in first-mile activities may hurt consumers in terms of higher prices, lower quality, and reduced innovation.

Third, terminal dues may disproportionately increase the demand for delivery services covered by the terminal dues system. One example of this is an increased demand for delivery of packets delivered by the designated postal operators as a substitute for parcels with track and trace features delivered by global integrators. Excessive demand for delivery services covered by the terminal dues system will result in allocative inefficiency where too many cross-border items are sent as packets and too few items are sent as parcels, compared to a market with terminal dues set at competitive levels. This problem is particularly relevant for e-commerce and low value shipments below two kilograms, which can be sent as either packets or parcels.

Fourth, terminal dues may lead to excessive cross-border traffic. Terminal dues may distort global bulk mail and e-commerce flows by increasing the demand for cross-border delivery relative to domestic delivery or domestic retail store sales. If cross-border delivery is priced disproportionately low compared to domestic delivery (as a result of low terminal dues) this may incentivize domestic bulk mailers to inject letters in foreign countries instead of injecting them domestically. Similarly, disproportionately low prices for cross-border delivery may incentivize e-shoppers to buy from (e-)retailers cross-border instead of buying from a domestic e-retailer or a local brick and mortar store. This leads to overall inefficiency and a waste of resources.

---

9 Transfers between delivery operators should only be considered a distortion as long as there are distortionary spill-over effects (e.g., compensation for postal operators' losses funded by taxes).

10 Such work-sharing is very common in many domestic mail markets.

Fifth, terminal dues may lead to excessive cross-border traffic from specific countries with particularly low terminal dues (typically transition countries) relative to other countries (typically target countries). For example, instead of buying online from a target country, e-shoppers may have an incentive to buy online from a transition country (enjoying even lower delivery costs because transition countries pay lower terminal dues) although this is not efficient. If the decision to buy from the transition country is triggered by disproportionately low terminal dues, this creates distortions.

Sixth, terminal dues may result in a transfer of money between designated operators within the UPU. The fact that terminal dues do not reflect the domestic price (or alternatively the costs) for last-mile activities implies that designated postal operators may lose money on inbound deliveries and earn money on outbound deliveries. Depending on the difference between the terminal dues and the cost for last-mile activities, as well as the composition of letter post flows, some designated postal operators will be net winners whereas others will be net losers. The transfer between designated operators may be distortionary if it spills over onto consumers (e.g., via increased taxes to fund the postal operator's loss).

Alternative systems create the same distortions

A comparison of the UPU system with REIMS (administered by the International Post Corporation) and bilateral agreements reveals that these systems create the same type of distortions. Due to their discriminatory nature (third party operators not having access to the rates in practice), both REIMS and bilateral agreements may distort first-mile competition. However, if the terminal dues applied under REIMS and bilateral agreements are closer to the price for last-mile handling of domestic letter post items than the UPU rates, this may make them less distortionary with respect to competition for last-mile activities and distortions of global mail and trade flows. In this case, the transfers between participating operators are also likely to be smaller than under the UPU system.

Designing a non-distortionary system for terminal dues

To design a non-distortionary terminal dues system, we need to identify the underlying drivers for the identified distortions. Our in-depth analysis of the different distortions reveals three main drivers:

- Terminal dues being discriminatory (towards third-party operators and between operators within the system);
- Terminal dues deviating from the price of last-mile handling of domestic letter post items;
- Terminal dues being lower than the long-run average incremental cost of domestic last-mile activities

In order not to distort incentives for agents in the value chain, a non-distortionary system for terminal dues must be non-discriminatory (same rate applied for the same service across all delivery operators, also non-designated ones). Moreover, non-distortionary terminal dues would have to equal the price for last-mile handling of domestic letter post items[11]. Adhering to the principle "similar prices for similar services" will ensure that in-

[11] Taking into account any additional costs associated with the handling of cross-border items.

centives throughout the value chain are economically efficient because the price difference between last-mile handling of domestic letter post and last-mile handling of cross-border letter post will reflect the cost difference between these services. Last, but not least, in order to prevent foreclosure of as-efficient non-designated operators, non-distortionary terminal dues must be at least as high as the long-run average incremental cost[12] of last-mile activities.

In addition to eliminating the identified distortions, an ideal system for terminal dues should adhere to a number of sound regulatory principles[13] for postal sector regulatory authorities and competition authorities. We find that a solution where terminal dues reflect the price for last-mile handling of comparable domestic letter post items would adhere to most of the requirements for postal tariffs specified by regulators in the United States and Europe.

We conclude that the ideal solution would be a terminal dues system where rates equal the price for last-mile handling of comparable domestic letter products (i.e., the same prices charged for the same service – last-mile delivery – irrespective of the origin of the letter post item). This conclusion is based on a joint assessment of the impact on distortions and the fulfilment of sound regulatory principles.

Need for a practical solution

Despite its many benefits in terms of reduced distortions, implementation of the ideal solution may not be feasible. This is due to practical and political concerns.

Practical concerns relate to the risk that the solution may be complex and burdensome to administer for designated postal operators and national authorities. For example, deciding which domestic postal products that are most similar to the inbound cross-border letter post mix (and thereby which prices to apply for last-mile handling of cross-border letter post) may not be straight forward. Political concerns regarding changes in the UPU terminal due rates primarily include the risk of reduced affordability of cross-border letter mail for some services or some postal operators, reduced profitability of designated postal operators, and reduced competitiveness of e-retailers in some countries.

In order to cope with political concerns related to affordability of cross-border letter post and sustainability of universal service provision, a practical solution could be to complement the ideal solution with an aid program for developing countries. The practical solution would imply that all countries introduce terminal dues equal to the price for domestic last-mile activities. Alongside this, a compensation scheme could be introduced for developing countries in order to ensure affordability of cross-border letter post and contribute to a sustainable provision of universal services.

---

12 The long-run average incremental cost is the (long-run) additional costs associated with the provision of a specific product. It is calculated as the average of all (fixed and variable) costs that a company incurs to produce a particular product (including product-specific fixed costs). If terminal dues are below the cost of last mile delivery, this means that an operator as-efficient as the designated postal operator will not be able to compete. Although there is no firm consensus about what the relevant cost benchmark should be, recent case law and the guidelines from the European Commission suggest that the relevant cost benchmark should probably be the long-run average incremental cost.

13 Sound regulatory principles are, for example, the provision of incentives for efficiency improvements, provision of incentives for high quality service provision, transparent pricing, and financial sustainability of universal service provision.

Measuring distortions created by terminal dues

In order to measure distortions, we propose a framework split into two steps. The first step is a qualification (or screening) step where the likelihood and significance of distortions are determined. The second step is a quantification step where the magnitude of the distortions is estimated. Only if distortions are identified as real and significant in the first step should one proceed to step two.

Approaches to assess the likelihood of distortions occurring are different for the different distortions identified. Whereas distortions of competition for last-mile handling of cross-border letter post items can be assessed by comparing terminal dues to the cost of last-mile activities or through benchmarking with market segments without any distortions created by terminal dues, other distortions require other approaches. For example, to assess the likelihood of a distortion of global mail and trade flows or distortions of demand for packets versus parcels, it is important to first establish to what extent terminal dues charged for last-mile activities have an impact on the price paid by end-users. If terminal dues do not have any impact on end-user prices for delivery, there will most likely not be any significant distortions of demand.

If terminal dues are found to have an actual impact on demand for delivery services, there are several options for how to assess the magnitude of the distortion in question. Simple comparisons of cross-border mail and trade flows and more advanced gravity models and difference-in-differences analysis can be used to estimate the impact of distortions on global mail and trade flows in terms of mail volumes and associated revenues.

In order to measure the effects of distortions on the wider economy (in terms of effects on social welfare, prices of services, import and exports, output, wages, and GDP) a more comprehensive approach is needed. A tool for this could be a computable general equilibrium (CGE) model.

Chapter 1

Background and methodology

1.1 Overview of international mail delivery

In 2012, total worldwide letter post traffic amounted to 350.9 billion items. Of this, approximately one percent (or 3.7 billion items) was sent internationally.[14] However, cross-border letter post volumes are expected to increase significantly. The expected growth is driven by cross-border e-commerce, growing by a rate of over 15 percent per year in Europe and almost 15 percent per year in the United States.[15,16]

According to estimates from the Universal Postal Union (UPU), 33 percent of all online trade is expected to take place cross-border by 2020.[17] Items bought online are often below two kilograms in weight and can therefore be sent in the letter post flow (as small packets or "bulky letters"). In fact, the UPU estimates that 80 percent of mail items generated by e-commerce today weigh below 2 kilogrammes and are processed in the letter-post streams.[18]

The main international letter post flows are between industrialized countries (Table 1).

Table 1 Top five international letter post flows (2011)

Flow	% of total international flows
Within Western Europe	43
Between Western Europe and North America	15
Between Western Europe and Eastern Europe & Central Asia	9
Between North America and Asia Pacific	8
Between Western Europe and Asia Pacific	8

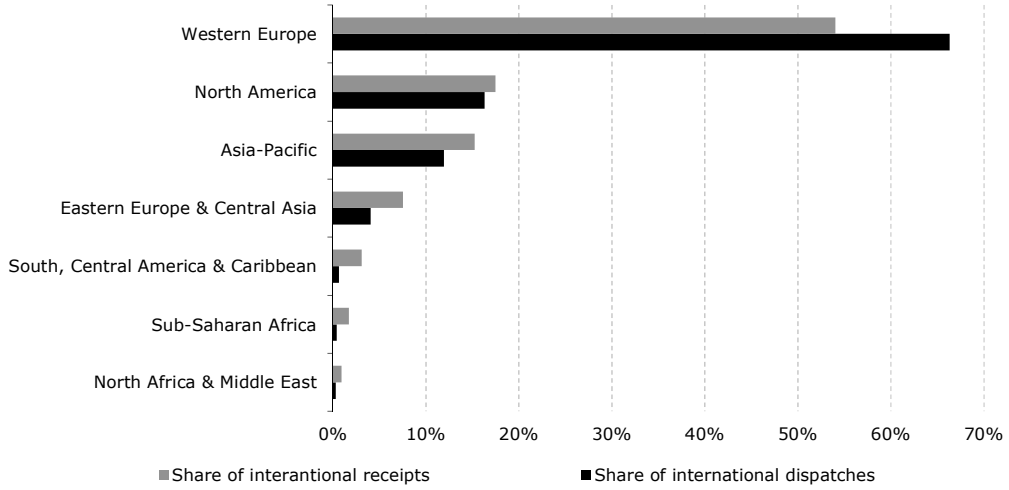
Note: Flows measured in kg

Source: Universal Postal Union (2014),*" Development strategies for the postal sector: An economic perspective", Chapter 8: Global postal connectedness, p. 196*

In 2011, 66 percent of all international letter post (by weight) was sent from Western Europe, 16 percent was sent from North America, and 12 percent was sent from the Asia-Pacific region.[19] A similar pattern is observed for the receipt of international letter post items (Figure 1). With Asia-Pacific exhibiting a strong growth in cross-border e-commerce, this pattern may change in the future.

14 The Universal Postal Union (2013), "Development of postal services in 2012"
15 European B2C E-commerce Report 2014, published during 2014 Global E-Commerce Summit, Barcelona
16 eMarketer 2013, "US Retail Ecommerce: 2013 Forecast and Comparative Estimates"
17 Universal Postal Union (2014), "Fulfilling the global e-commerce promise". Presentation by Marc Fardelli, chair, .post group, UPU Postal Operations Council, 24 March 2014
18 Universal Postal Union website, "Activities, Letter Post Development, About Letter Post Development", http://www.upu.int/en/activities/letter-post-development/about-letter-post-development.html
19 Universal Postal Union 2014, "The economic geography of international postal exchanges," *Development strategies for the postal sector: An economic perspective*

Figure 1 International dispatch and receipt of letters, 2011



Note: Mail flows (dispatches and receipts) are measured in numbers of kilogrammes of letters

Source: Universal Postal Union 2014, "The economic geography of international postal exchanges," *Development strategies for the postal sector: An economic perspective*

1.2 Terminal dues

International delivery of letter post items involves multiple steps and charges. Notably, the delivery of a cross-border letter post item consists of *outbound* or *first-mile activities (collection in the country of origination and transport to the country of destination)* and *inbound* or *last-mile activities (transport, sorting, and delivery in the destination country*). As each delivery operator often is active only in one or a few countries, delivery operators have to cooperate in order to deliver cross-border. The cooperation implies that the first-mile operator in the originating country hands over the cross-border item to the last-mile operator in the destination country who delivers the item against a payment from the first-mile operator.

In this report, the term "terminal dues" describes the rates paid by postal operators for last-mile handling of cross-border letter post items. Throughout the report, the term "letter post" is used to describe the delivery services subject to terminal dues. In addition to small and large letters, the definition of letter post also includes packets (or "bulky letters") which often are used to deliver products bought online (Box 1).

Other charges relating to international mail (which are outside the scope of this report) include "inward land rates," which apply to last-mile handling of international parcel post, and "air conveyance dues" and "transit charges," which apply to transportation of international mail which a postal operator provides for mail exchanged between two other postal operators.[20]

[20] Air conveyance dues may also apply to long distance air transportation provided by a destination postal operator within its own country.

Box 1 Definitions of letter post and parcel post

Under the Universal Postal Convention, "letter post" is the international postal service for the conveyance of letters, postcards, printed papers, and small packets weighing up to 2 kg (with some exceptions).

Generally, the UPU defines "letter post" as including letters and postcards, printed papers, and small packets. Letter post is also defined is also classified by format as including "small letters"(P), with a maximum weight of 100 grams (3.5 oz.) and maximum dimensions of 165 x 245 x 5 mm (6.50 x 9.6 x 0.2 in.); "large letters" (G), also called "flats", with a maximum weight of 500 grams (17.6 oz.) and maximum dimensions of 305 x 381 x 20 mm (12.0 x 15.0 x 0.8 in.); and "bulky letters" (E), also referred to as "small packets" with a maximum weight of 2 kg (4.4 lbs.) and maximum combined dimensions of 900 mm (35.4 in.).

The term "packet" or "small packet" is loosely but customarily equated with "bulky letters" (E) and thus refers to any letter post item that cannot be classified as a "small letter" (P) or a "large letter" (G). The maximum weight of packets may be increased to 5 kg (11.0 lbs.) by agreement between postal operators. Packets are often used to deliver bulky items, such as small e-commerce items, which do not fit into a standard letter envelope.

Parcel delivery, or "parcel post" service in UPU terminology, is used when the item to be sent does not fit within the requirements for letter post services or when the sender requires a value added service that is not available for letter post items. Parcels can thus be both small and large in size and weigh both more and less than letter post items. It should be noted that the outbound services of a national postal operator do not necessarily incorporate UPU terminology or correspond one to one with the underlying UPU packet and parcel services.

Source: UPU (2013), Letter Post Manual, Conv. Art 14.

There are multiple systems governing terminal dues payments between delivery operators. The system covering most delivery operators is prescribed by the UPU, i.e., by intergovernmental agreement, and is available to the designated operators (only) of all 192 UPU members. Another system covering many operators is REIMS[21], which is currently on its fifth iteration (REIMS V). REIMS is an inter-operator agreement which is administered by the International Postal Corporation (IPC). Postal operators who do not use UPU terminal dues or REIMS rates engage in bilateral terminal dues agreements.

Whereas the UPU terms and conditions for terminal dues are public, this is not the case for REIMS and bilateral agreements. Information about these agreements in this report is thus based on secondary sources, such as existing literature and interviews with industry experts. Based on the information we have obtained, the main differences across the three terminal dues arrangements seem to be the level of remuneration, the use of quality incentives, and the use of parameters such as weight and format of mail items as determining factors for the rates paid (Table 2).

[21] REIMS stands for Remuneration of International Mails

Table 2 Overview of systems for terminal dues

	Public terms of agreement	Set rates as percentage of domestic rates	Rates subject to caps and floors	Rates based on quality of service	Distinction between different mail formats when setting rates	Rates available to both designated and non-designated operators
UPU	Yes	Partly[1]	Yes	Partly[2]	No	No
REIMS	No	Yes	No	Yes	Yes	No[3]
Bilateral agreements	No	Unknown	Unknown	Unknown	Unknown	No

Note: [1]UPU rates for target countries are in theory set based on their domestic single piece postage (list price). However, in reality, actual rates paid are in almost all cases subject to rate caps and floors.

[2]UPU rates incorporate quality of service for participating target countries and for some transition countries that choose to participate.

[3]REIMS II was, according EU Commission decisions, available to non-designated operators. The current version is not subject to the same exemption decision, as far as we can tell, nor is it in practice available to third parties.

Source: Universal Postal Union, "About terminal dues and transit charges"; International Post Corporation, "Managing intercompany pricing"; Sorensen, Janet M., "International Terminal Dues White Paper"; Campbell, "Comment on REIMS II Terminal Dues Agreement" (1998) and "Evolution of the Postal Function in Long Distance Markets" (1997), *Collected Papers on Specific Postal Policy Issues*; Universal Postal Union 2013, "Statistics and Accounting Guide"

The UPU terminal dues system

The current UPU system for terminal dues (which is the main focus of this report) consists of a two-tiered system, where countries are divided into "target" and "transitional" countries.[22] The *target system* and its applicable rates have traditionally been used for the exchange of letter post between designated operators in industrialized countries[23], while the *transitional system* and its applicable rates apply to the exchanges to, from, and between developing countries.[24] However, the "new" target countries that transitioned to the target system in 2010 and 2012 include several developing countries as defined by the United Nations.

UPU members are divided into six groups (Table 3) based on the postal development index (PDI), which comprises a macroeconomic component (gross national income, GNI, per capita) and a postal-specific component (normal unit cost per letter based on full-time staff).[25] Operators in groups 1.1, 1.2, and 2 belong to the target system. Operators in groups 3, 4, and 5 belong to the transition system but are expected to transfer to the transition system in the future.

22 An overview of the target and transition countries is available in Annex A.

23 "Industrialized" and "developing" countries within the UPU context are based on a list determined by the United Nations Economic and Social Council. It should be noted that many of the countries or territories considered to be developing are highly industrialized (e.g., Hong Kong, Singapore).

24 UPU (2013) "Statistics and Accounting Guide"

25 Universal Postal Union (2007), 24th Congress, Doc. 19 Rev. 1, "Terminal dues system: Joint Council of Administration and Postal Operations Council report"

Table 3 Universal Postal Union groups

Group	Number of countries	Description
1.1	41	Countries in target system prior to 2010
1.2	13	Joined target system in 2010
2	22	Joined target system in 2012
3	39	Will join target system in 2016
4	54	Will apply transitional system for 2014-2017
5	49	Will apply transitional system for 2014-2017

Note: UPU members are divided into six groups based on the postal development index (PDI), which comprises a macroeconomic component (gross national income, GNI, per capita) and a postal-specific component (normal unit cost per letter based on full-time staff)

Source: UPU 2013 "Statistics and Accounting Guide"

UPU terminal dues rates are determined based on multiple parameters:

- per item and per kilogram rates (for operators in transition and target countries[26])
- domestic tariffs (for operators in target countries)
- per item and per kilogram caps (for operators in target countries)
- per item and per kilogram floors (for operators in transition and target countries)
- quality incentive (for operators in target countries and operators in transition countries that choose to participate)

For transition countries, the UPU terminal dues system prescribes rates per item and per kilogram.[27] For mail flows below 75 tons, an average number of items per kilogram of mail[28] is applied to these per item and per kilogram rates to develop one per kilogram rate for transition countries. These per item and per kilogram rates for the transitional system are equal to the floor of the target system for any given year.[29] Any country in the transitional system may at any time opt to be treated as a target country.[30]

For target countries, the UPU terminal dues system prescribes methods of rate calculation based on domestic tariffs. The rates are based on 70 percent of the domestic tariff for a 20-gram priority small letter and a 175-gram priority large letter (see annex A.1).

The following formula is used for calculating the terminal dues for a given mail flow under the UPU system:

$$Terminal\ dues = (Number\ of\ items) * (Rate\ per\ item + [Rate\ per\ kilogram\ * Weight\ per\ item])$$

In addition to the above, the target system also prescribes caps and floors (per item and per kilogram). The level of the floors and caps depend on group classification (1.1, 1.2 or 2). From 2014 and onwards, counties in the target system is subject to a secondary cap where the rates applied for flows between countries in the target system in a given year shall not lead to an increase of more than 13 percent in the base terminal dues revenue

[26] A worldwide average number of items per kilogram may be applied to the per item/per kilogram rates in the transition system to determine one per kilogram rate for flows below 75 tons.

[27] Universal Postal Union (2012), Universal Postal Convention Articles 29, 30, and 31. See also Universal Postal Union (2013), "Statistics and Accounting Guide"

[28] The average number of items per kilogram is based on a UPU study of global mail traffic flow characteristics.

[29] Universal Postal Union (2013), "Statistics and Accounting Guide"

[30] Universal Postal Union (2013), "Statistics and Accounting Guide"

before quality of service adjustment for a letter-post item of 81.8 grams, compared to the previous year. In practice, caps and floors are so close to each other that the terminal dues applied by target countries often is a fixed rate which is not aligned to the domestic price (as may appear at first sight).

UPU data suggests that more than 80 percent of designated operators in group 1.1 will be subject to either caps or floors for intra-1.1 group letter flows between 2014 and 2017. For letter flows within groups 1.2 and 2, or between groups 1.1, 1.2, and 2, the share of operators subject to caps and floors are between 96 and 100 percent (Table 4).

Table 4 Target countries constrained by UPU floors or caps

Flows	Cap/floor	2013 (%)	2015 (%)	2017 (%)
Intra-1.1 (41 countries)	Cap (per kg/per item)	71/61	71/71	71/71
	Floor (per-kg/per-item)	17/17	17/17	17/17
	Cap or floor	**88**	**88**	**88**
Intra-1.2, Intra-2, inter-1.1, 1.2, and 2 (76 countries)	Cap (per-kg and per-item)	100	59	57
	Floor (per-kg and per-item)	100	39	39
	Cap or floor	**100**	**98**	**96**

Note: The table shows the share of countries in the relevant group(s) constrained by UPU caps or floors in 2013, 2015 and 2017. Total number of countries in groups 1.1, 1.2 and 2 are 76. Group 1.1 consists of 41 countries.

Source: UPU tool: Terminal Dues Impact, 2012

Together with the fact that transition counties pay a fixed terminal dues rate (often per kilogram), this means that the UPU system fails to be country-specific and linked to the cost of last-mile activities. It also fails to align the price for last-mile handling of cross-border letter post (i.e., the terminal dues) with the price for similar services (last-mile handling of domestic items). As we will show later in this report, this characteristic is an important driver of the distortions created by the current terminal dues system.

In the UPU system, quality plays a role in the terminal dues owed between postal operators in two ways: through an adjustment of terminal dues rates according to quality of service (for operators in target countries with annual inward mail flows above 100 tonnes and for operators in the transition system that choose to participate), and through the Quality of Service Fund (distributed to operators in the transition system).

The quality of service adjustment of terminal dues for target country operators involves a potential participation bonus corresponding to a five percent increase in base terminal dues rates, which the postal operator automatically receives for participating in the quality of service system. If the performance target is not achieved, a penalty factor is applied corresponding to one third of one percent reduction for each one percent below the performance target. The penalty factor will be applied such that the reduction is no greater than ten percent. A penalty of ten percent may not lead to remuneration less than 95 percent of the base terminal dues rates or less than the terminal dues floor rates.[31]

[31] Universal Postal Union (2013), "Statistics and Accounting Guide"

Depending on the country of origin, the country of destination, and the year, all designated postal operators except for those in Group 5[32] pay an additional fee of between two percent and 20 percent of terminal dues to a Quality of Service Fund for transition system operators.[33] The fund is governed by the UPU, and distributed to postal operators in transition countries to improve postal services.

The REIMS terminal dues system

REIMS currently has 26 signatories, including all major European designated operators. Some of these operators have only signed parts of the agreement, e.g., REIMS East which includes a number of transitional elements applicable to postal operators in Eastern Europe. According to the IPC, only one-third of EU international mail volumes in 2009 were settled under REIMS.[34]

REIMS establishes terminal dues for the same standardized mail formats as the UPU (with the difference that REIMS also specifies different rates for different formats). REIMS is based on four principles:[35]

- Tariffs defined as a percentage of the domestic single piece letter postage[36]
- Quality of service incentives with individual penalties and bonuses
- Transitional period
- Protection against remail

The European Commission has earlier required REIMS terms and conditions to be made available to third parties. On 23 October 2003, the European Commission adopted a decision in case COMP/C1/38170 REIMS II, prolonging for an additional five years the exemption of the REIMS II Agreement from EC Competition Law. This decision was conditioned on the awarding to third parties of non-discriminatory access to REIMS II delivery terms and conditions.[37] However, we have been unable to discern whether such a condition has been placed on the current REIMS V agreement. What we can observe is that to date only one non-designated operator (IMX[38]) has accessed the REIMS agreement.

According to third party operators, it is virtually impossible for non-designated operators to access REIMS conditions. In 2011, Denis Cayet, CEO of IMX France, reported that *"IMX France is the only private postal operator taking advantage of the Third Party Operator opportunity provided by the Commission in the REIMS II Renewal decision"*. He also held that IMX, as the only private operator with access to REIMS rates, had gained a competitive advantage in the market for international mail.[39] Similarly, the Free and Fair Post Initiative argued in 2012 that the awarding to third parties of non-

32 Group 5 countries are Least-Developed Countries as defined by the United Nations Economic and Social Council

33 Country groups one through four must pay 20% of their terminal dues payment to Group 5 countries into the Quality of Service Fund for the Group 5 countries.

34 Approximately one third were settled under alternative agreements such as UPU or bilateral agreements and approximately one third were injected directly in domestic networks. Source: IPC (2009), "Trends and challenges in cross-border mail markets"

35 IPC (2009), "Trends and challenges in cross-border mail markets"

36 Under REIMS II, 80 percent of the domestic price for a single-piece priority letter

37 Baratta (2004), "The REIMS II exemption decision: enhancing competition in the cross-border mail market through third party access"

38 IMX is a private pan-European mailing group of companies specializing in the distribution of periodicals, direct marketing, mail order, promotional material and business mail

39 Denis Cayet, CEO IMX France, Presentation, WIK, 1 December 2011, "How UPU Regulations Affect a Private Operator"

discriminatory access to REIMS delivery terms and conditions was not respected in practice.[40]

Bilateral terminal dues agreements

Some postal operators conclude bilateral agreements, often due to the operators' international profiles and their ability to negotiate more beneficial rates bilaterally. Examples of operators relying on bilateral agreements include PostNL (NL), Swiss Post (CH), Austrian Post (AT), Itella (FI), Royal Mail (UK), Post Denmark (DK), Posten AB (SE), and the USPS.[41] Conditions in bilateral agreements are confidential, but are likely closer to the price for last mile delivery of domestic letter post items than the UPU rates. In the United States, bilateral agreements are required by law to improve the net financial position of the Postal Service or enhance the performance of operational functions.[42] Thus, one may expect rates negotiated in bilateral agreements to be higher than the UPU rates.

1.3 Market distortions highlighted in existing literature

The UPU system for terminal dues has been criticized for being distortionary in its nature. To create an overview of the distortions discussed in previous literature, we have reviewed 49 documents that pertain to terminal dues.[43] Of the sources reviewed, twenty-one brought up market distortions created by the current terminal dues system (Figure 2).

Of those, 71 percent discussed terminal dues as a means of transferring money between designated postal operators. An equally large share discussed distortion of competition for first-mile and last-mile activities. Sixty-two percent discussed distortion of international mail flows, especially relating to remail. Twenty-four percent discussed terminal dues as inefficient "foreign aid," touching on their role as subsidies and the resultant spillover effects. Last, but not least, 5 percent (one source) discussed the distortion of competition between e-retailers in transition and target countries.

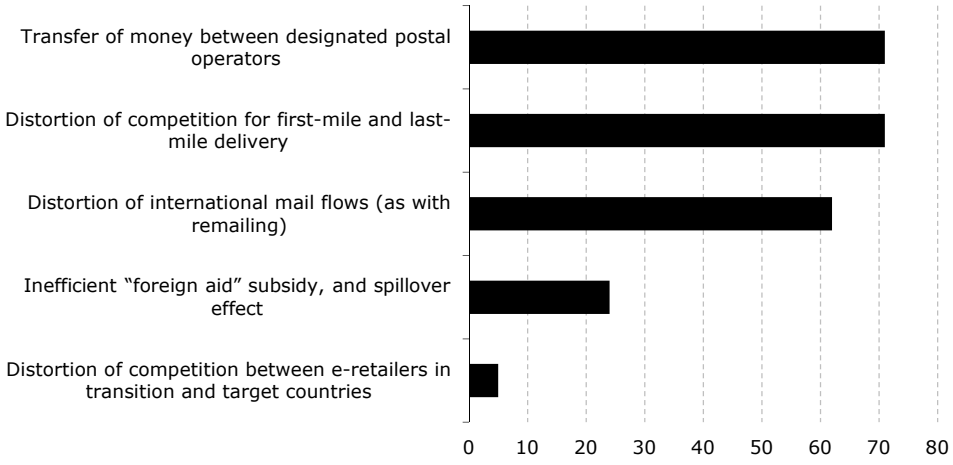
40 Free & Fair Post, "FFPI Contribution to the consultation on the ERGP Report on 'Access' to the postal network and elements of postal infrastructure"

41 Walter Trezek, Ipostes, in correspondence

42 Postal Regulatory Commission (2013), "Notice of United States Postal Service of Type 2 rate adjustment, and notice of filing functionally equivalent agreement," filing ID 88294

43 See Annex A3 for an overview of the sources and the results of the screening.

Figure 2 Distortions identified in previous literature



Source: Copenhagen Economics

In what follows, we briefly describe each of the distortions identified in existing literature.

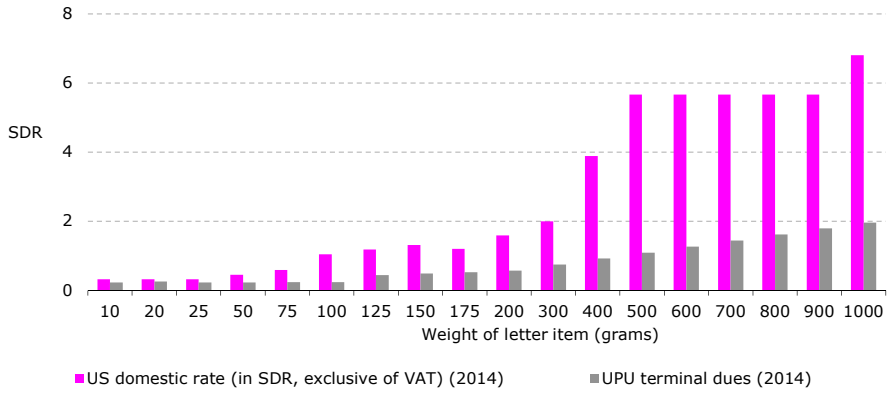
Transfer of money between designated postal operators

Several publications emphasize that terminal dues paid to target countries do not cover the cost of last-mile activities and that this (in combination with the structure of bilateral mail flows) creates winners and losers among the participating postal operators.[44]

The cost of last-mile handling of cross-border letter post items is often approximated in previous literature as a share (normally 70-80 percent) of the list price for domestic (end-to-end) delivery of single piece letter items. For some postal operators, such as the USPS, there is a marked difference between the price for domestic letter delivery and the amount of compensation received from the UPU terminal dues system based on the cap. Figure 3 shows the price for domestic first class delivery of a normal-shaped letter compared with the terminal dues received for a cross-border letter sent from Denmark. As the diagram shows, there is a marked difference between domestic delivery prices and terminal dues, primarily for items weighing more than 25 grams. This is also the case if the domestic postage is reduced by 20-30 percent.

[44] The "winners" often referred to include Royal Mail, USPS, and Correos, while "losers" include Post Italiane, Norway Post, Japan Post, Canada Post, An Post (Ireland), Itella (Finland), and Post Denmark. Cf. Campbell, "UPU terminal dues: winners and losers"

Figure 3 Terminal dues vs. domestic rates, United States



Note: Prices from USPS for normal-shaped letter, using First Class shipping when 300 grams or under, and using priority shipping when over 300 grams. Used First Class Mail rates in certain instances, instead of priority, because although the UPU states that UPU terminal dues are calculated with priority rates, the amounts it cites as examples for US domestic rates are for First Class.

Source: United States Postal Service website; Universal Postal Union 2013, "Statistics and Accounting Guide"

If terminal dues are lower than the actual cost for last mile delivery, this implies that postal operators (compared to a situation where terminal dues cover the cost of last-mile activities) lose money on inbound letters and gain money on outbound letters (Box 2).

Box 2 Gains and losses created by below-cost terminal dues

In this example, we consider two operators, A and B.

A is a high-cost operator with a cost of last-mile activities of 1.0. B is a low-cost operator with a cost of last-mile activities of 0.6. The terminal dues on all transactions between A and B are set at 0.5 (i.e., below cost for both operators). This implies that operator A loses 0.5 (0.5-1.0) on every inbound item and gains 0.1 (0.6-0.5) on every outbound item, compared to a situation where the terminal dues would be equal to the cost of the activities performed. Similarly, operator B loses 0.1 (0.5-0.6) on every inbound item and gains 0.5 (1.0-0.5) on every outbound item, compared to a situation where the terminal dues would equal the cost of the activities performed.

Losses and gains per item in relation to inbound and outbound activities

	A	B
Loss per item on inbound activities	-0.5	-0.1
Gain per item on outbound activities	0.1	0.5

If the two bilateral flows between A and B are symmetrical, this implies that the high cost operator A achieves a net loss of 400 whereas the low cost operator B achieves a net gain of 400.

Transfer from country A of country B
Balanced flow: 1,000 items from A to B, and 1,000 items from B to A

	A	B
Total loss on inbound activities	-500	-100
Total gain on outbound activities	100	500
Net gain/loss	-400	400

In previous literature, this mechanism is often referred to as a transfer or subsidy between postal operators where money is transferred from the high cost to the low cost operator.

Source: Copenhagen Economics

When assessing the effect of the terminal dues system on designated postal operators' financial positions, one needs to compare the current situation against a counterfactual situation with an alternative set of terminal dues that provides a demonstrable improvement over the current system. The difference between the two situations should be considered an effect of the current terminal dues system.

A set of alternative terminal dues in the counterfactual which would reduce the losses (gains) on inbound (outbound) deliveries could for example be defined by cost-based terminal dues or terminal dues equal to the prices of similar domestic delivery services. In practice, previous studies have used a counterfactual terminal dues system with terminal dues set at a percentage (typically 70-80 percent) of the domestic price of end-to-end delivery of a single-piece letter, assumed to represent the cost of last-mile handling of cross-border letter post items.[45]

[45] The assumption that the cost of last-mile delivery of cross-border mail can be approximated by 70-80 percent of the price for domestic end-to-end delivery of single piece letters is not necessarily correct. In a study about postal operators' pricing behaviour, conducted on behalf of the European Commission in 2011, we found that single piece items (on average) were priced over 45 percent higher than transactional bulk mail and bulk mail was priced almost 50 percent higher than direct mail. This suggests that a 20 percent discount on single piece tariffs may not be enough to reflect the cost of last-mile delivery of cross-border letters.

A change in the terminal dues system would influence the financial position of postal operators, given their bilateral mail flows, via two channels: import and export of letter post.

For import volumes, the effect (for a specific postal operator) would equal the change in terminal dues charged times the volume of inbound cross-border letter post items. The effect will be positive (i.e., an increase in the net revenue) if current terminal dues are below cost or domestic prices.

For export volumes, the effect would equal the change in the weighted terminal dues for the export basket (i.e., containing a mix of export countries) times the volume of outbound cross-border letter post items. In the counterfactual situation, terminal dues will increase in some countries and decrease in others. This means that the net effect on the export side will depend on the mix of countries in the export basket. However, since most international mail volumes are sent to industrialized countries (cf. chapter 1) and since terminal dues in these countries often are capped, the weighted terminal dues for export mail will most likely increase for most countries in the counterfactual.

The net effect for a postal operator will thus to a large extent depend on whether the operator is a net importer or a net exporter of mail (although the relative change in terminal dues for import and export mail also will have an impact) (Table 5).

Table 5 Effect of changes in terminal dues

	Net exporter	Net importer
Relative increase in terminal dues (import terminal dues increase more than export terminal dues)	Net effect unclear	Net gain
Relative decrease in terminal dues (import terminal dues increase less than export terminal dues)	Net loss	Net effect unclear

Source: Copenhagen Economics

Net-importing operators who lose money on delivery of inbound mail may try to recover these losses somehow, e.g., via rebalancing of domestic and international tariffs, via lower profit, or via compensation from the government (something which may spill over in higher taxes to the detriment of consumers). Higher tariffs may not be possible due to a number of factors, such as: competition for outbound international mail and e-substitution; competition for domestic mail by consolidators, local or regional delivery operators, and e-substitution; or regulation of letter mail tariffs.

Distortion of competition between designated and non-designated operators

Because UPU terminal dues are only available to designated postal operators, non-designated operators (including extraterritorial offices of exchange - ETOEs - run by designated operators) pay higher rates for last-mile handling of cross-border mail with a designated operator.

As a result, designated postal operators may use prices based on low terminal dues to exclude competitors from the markets for outbound (first-mile) and inbound (last-mile) delivery of letter post. Although the distortions of competition in first-mile and last-mile

activities are very different, previous literature often does not distinguish between the two.

For first-mile handling of outbound letter post items, the risk is distorted competition between the designated operator and multinational, national, and regional carriers collecting, consolidating, and transporting bulk mail. This risk is only relevant for products subject to (potential) competition, such as bulk letters and single-piece packets (often used for e-commerce).

Similar to other non-designated operators, ETOEs run by designated operators do not have access to UPU terms and conditions when competing for cross-border mail delivery (Box 3). The UPU system may thus distort competition between ETOEs and designated operators.

Box 3 ETOEs: Description and implications

An extraterritorial office of exchange (ETOE) is defined as a facility operated by a designated postal operator in the territory of another country. An ETOE is a special kind of International Mail Processing Centre (IMPC) with the purpose of processing mail items under the set specifications of international mail exchange. The majority of ETOEs are operated by European postal operators. One function of ETOEs is increasing mail volumes of designated postal operators through participation in the markets of foreign territories. In addition to gathering mail destined for the home country, ETOEs are also competing for cross-border volumes destined for other countries. For example, an ETOE owned by the designated operator in the Netherlands may compete for cross-border volumes between the UK and the United States via its ETOE in the UK.

The UPU Congress resolution C6/2012 reported 141 known ETOEs worldwide in 2011, up from 110 in 2008. Because ETOEs are affiliated with designated operators, they could in principle benefit from the service provisions and terminal dues rates available to UPU members. Under 2004 and 2012 UPU resolutions, however, ETOEs are considered strictly commercial entities, and are not covered by universal service provisions available to designated operators – including terminal dues rates. Nevertheless, the UPU resolutions instruct member states to respect national policies of individual countries, e.g., legal requirements of non-discrimination.

UPU members disagree about policy towards ETOEs. Some designated operators operate ETOEs, and they have been the topic of ongoing discussion since 2007. The current discussions regard new standards for IMPC codes.

Note: ETOEs operate directly in foreign markets, and compete for the volumes of outbound and inbound mail. The illustration shows an example where country A handles outbound mail to country D from three different origin countries: A, B, and C. Sometimes, mail items for country Dare consolidated in country A instead of sent directly from B or C to D.

Source: Definition by UPU Congress resolution C6/2012. Leong, Bahar & Papakrivopoulos (2008)

For inbound mail, the risk is of distorting competition between the designated operator and those operators delivering bulk letters or small packets. As with the outbound mail scenario, this risk is only relevant for products subject to (potential) competition.

The UPU terminal dues system has been analysed from a competition law point of view with the conclusion that it produces price fixing without any pro-competitive elements which could outweigh the negative effects (Box 4).

Box 4 Compatibility of UPU terminal dues with EU competition law

By determining the rates paid between designated postal operators for last-mile handling of cross-border letter post items, the UPU system could be thought of as a price fixing agreement, which infringes EU competition law.

EU competition law, article 101, prohibits concerted practice between undertakings, prohibits price-fixing, and prohibits anti-competitive agreements. EU competition law allows for exemptions when pro-competitive elements are present and substantial in a given agreement, and when a significant part of benefits produced by a given agreement are passed on to consumers.

REIMS II was granted exemptions by the European Commission, based on pro-competitive elements (quality and efficiency incentives), better cost-alignment than the UPU rates (no caps or floors), and the condition that they incorporate non-discrimination between all operators.

However, without non-discrimination towards third-party operators and proper cost-alignment (primarily due to caps and floors) the UPU system may not produce the same pro-competitive elements.

Source: Geradin (2012), EU Competition law, articles 101 and 102

Distortion of international mail flows

UPU terminal dues are set differently for target countries than for transition countries. The aim is to progressively incorporate the developing and least developed countries into the target system that already applies to industrialized countries.[46]

These differences in rates between countries lay the groundwork for the possibility of arbitrage through injection of mail in a transition country in order to capitalize on low terminal dues. Arbitrage could come in the form of "remail" (Box 5) where mail items or data are transported across the border for injection in a foreign country.

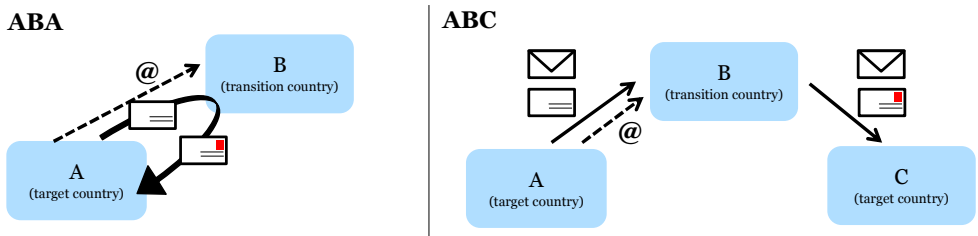
[46] UPU (2014), "About terminal dues and transit charges," UPU website, http://www.upu.int/en/activities/terminal-dues-and-transit-charges/about-terminal-dues-and-transit-charges.html

Box 5 Remail: Description and implications

"Remail" is letter post items which are posted in a country other than the country where the mailer "resides". The sender might physically send the mail to a second country for posting using a private operator or ETOE or "cause it to be posted" by transferring the electronic data from which the mail is prepared. Where a company is considered to reside is matter of judgement for postal officials. A large multinational company like Citibank (in one famous case in Europe) could be deemed to reside in almost every country in the world.

There are two main types of remail: ABA and ABC. In ABA remail, mail originating in country A is injected in country B, and sent back to A. In ABC remail, mail originating in country A is posted in country B, and sent to country C. In the example below, country B is a transitional country that enjoys lower terminal dues rates, while countries A and C respectively are target countries.

Illustration of ABA and ABC remail



Under article 28 of the 2012 Universal Postal Convention, UPU postal operators are allowed to confiscate and detain what appears to be ABA and ABC remail, in order to demand additional compensation. They may also refuse to deliver the mail items. The stated purpose of article 28 is to prevent mailers from taking advantage of the terminal dues system.

Note: Remail refers to the situation when mail from one country is injected in another by a private or a foreign-designated operator

Source: Ghosal 2002, Joint Cases C-147/97 and C-148/97, Deutsche Post AG v. Gesellschaft für Zahlungssysteme mbH (GZS) and Citicorp Kartenservice GmbH, and USPS (2012) report: EN-WP-12-001

Inefficient foreign aid subsidy

The two-tier structure of the UPU terminal dues system and the quality of service fund (with contributions calculated based on terminal dues) aims at supporting less developed countries in their provision of international delivery of letter post items.

Whereas the quality of service fund directly finances projects aimed at improving the quality of inbound letter-mail flows, the (generally) lower terminal dues rates given to transition countries come with no stipulations that the savings on outbound mail are used to improve postal delivery in the country. The two-tiered system has therefore been criticised for creating potential for arbitrage without effectively helping those countries who need it the most.

Distortion of competition between e-retailers in transition and target countries

Restrictive terminal dues caps on cross-border deliveries to target countries and different terminal dues for letter post items posted in developed (target) and developing (transition) countries make it possible for e-retailers to offer low-cost delivery from transition countries to target countries. This allows for a distortion of competition between retailers in target and retailers in transition countries and may also have potential implications for the decisions of where to locate warehouses or production for e-commerce.

1.4 An economic framework for identifying distortions created by terminal dues

To determine whether and how terminal dues distort decisions of market players, we must first establish which ideal state is being deviated from and thus what constitutes a distortion of this state. In accordance with economic theory[47], prices have an important signalling function in a market. In a free market, prices rise and fall to reflect scarcities and surpluses. If prices are rising because of high demand from consumers, this is a signal to suppliers to expand production to meet the higher demand. Similarly, if there is excess supply in the market, the price mechanism will help to eliminate a surplus of a good by allowing the market price to fall.

For competitive markets to work, all economic agents (consumers and producers) must respond to appropriate price signals in the market. Economic theory states that rational decision-makers weigh the marginal benefit received from an option with its marginal cost, including the opportunity cost. Market failure occurs when the signalling and incentive functions of the price mechanism fail to operate optimally leading to a loss of economic and social welfare. For example, consumer preferences for goods and services may be based on imperfect information about the costs and benefits of a particular decision to buy and consume a product.

According to standard economic theory, the ideal state is a situation where allocative efficiency is maximized. In this situation, social surplus and economic efficiency are maximized and there is no deadweight loss. In this situation, the additional benefits received by consumers from consumption of an additional unit of a product or service should equal the marginal costs of producing another unit of that product or service. In economics terms: The marginal social benefit (MSB) should equal the marginal social cost (MSC). This also means that the additional benefit received by consumers from switching its consumption from one product to another should equal the additional (marginal) costs of producing the product to which the consumer switches.

The incentives that producers and consumers have can be changed by interventions in the market, for example by government intervention in terms of taxes or subsidies that changes prices. Interventions like this distort price signals in the market and imply that prices no longer reflect scarcities or surpluses of resources.

[47] See for example Varian (2002), Intermediate Microeconomics, p. 562

According to the economic framework outlined above, economic agents make economically *inefficient decisions* when price differences between two products or services do not correspond to the actual cost differences for the same alternatives. This may result in allocative efficiency, i.e., excessive demand for some services and too low demand for others.

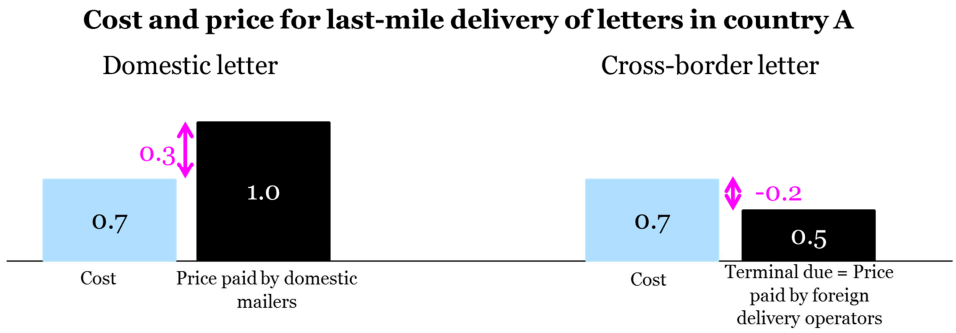
For example, a distortion will occur when the difference between the terminal dues (i.e. the price for last-mile activities) for a cross-border letter and the price for last-mile handling of a domestic letter is greater (or smaller) than the difference in actual costs for last-mile handling of domestic and cross-border letters. In this situation, decisions made by agents in the value chain are based on price signals that differ from the actual costs incurred. In this way, terminal dues that are lower than the domestic price for last-mile activities will increase the incentive for e-shoppers to buy cross-border instead of domestically (Box 6) although this is not efficient.

Box 6 Market distortion leading to allocative inefficiency

Market distortions leading to allocative inefficiency occur when the price-cost relationship for last-mile activities is different for domestic and cross-border letters.

Example:
Mark-up on cost for domestic letters: 0.3
Mark-up on costs for cross-border letters: -0.2
→ Provided that this is the only price that matters for the mailer, there will always be a preference for cross-border delivery (although the cost of providing the two services is the same)

Cost and price for last-mile handling of letters in country A



Note: Numbers are hypothetical
Source: Copenhagen Economics

Terminal dues are distortionary when they have a negative impact on allocative efficiency, e.g., by incentivizing buyers of delivery services to buy too little or too much of certain services compared with an optimal situation where a hypothetical "social planner" knows the true costs of delivery. Terminal dues can also be distortionary through incentivizing buyers of delivery services to buy delivery from a less-efficient delivery operator or triggering inefficient printing or enveloping of hybrid mail items or magazines in transition

countries (*productive inefficiency*[48]). Last, but no least, terminal dues may create distortions by preventing "as-efficient" competitors from competing in the cross-border delivery markets (*dynamic inefficiency*[49]).

[48] Productive efficiency is efficient provision of services, and is achieved when the output is produced at minimum average total cost (ATC). The operator with the lowest costs should be the one to provide services.

[49] Dynamic efficiency describes an economy with an appropriate balance of short run concerns (static efficiency) and long run concerns (technological progress and innovation). Dynamic efficiency is encouraged by effective competition leading to new processes and new products.

Chapter 2

Distortions created by current systems for terminal dues

2.1 Summary of findings

Our review of the UPU system for terminal dues shows that the current system of terminal dues could distort decisions made by agents in the postal delivery value chain. The suboptimal decisions may result in allocative, productive, and dynamic inefficiencies throughout the value chain.

The distortions detected can be grouped into six main categories (Table 6).

Table 6 Overview of distortions created by terminal dues

Distortion	Allocative inefficiency	Productive inefficiency	Dynamic inefficiency
Competition for last-mile handling of cross-border letter post items		x	x
Competition for first-mile handling of cross-border letter post items		x	x
Demand for delivery products within and outside the scope of the terminal dues system	x		
Global mail and trade flows, domestically vs. cross-border	x	(x)	
Cross-border mail and trade flows, target vs. transition country origin	x	(x)	
Transfer between delivery operators (spill-over to other services)	(x)		

Note: Parentheses denote potential inefficiencies

Source: Copenhagen Economics

First, terminal dues may distort competition for *last-mile handling* of cross-border letter post items. This is the case when the terminal dues paid to the last-mile designated operator is lower than the cost of last-mile activities. In this situation, an as-efficient delivery operator cannot compete with the designated operator for last-mile activities. Although there is no firm consensus about what the relevant cost benchmark should be (how large share of joint and common costs should be included), recent case law[50] and guidelines from the European Commission[51] suggest that the relevant cost benchmark should probably be the long-run average incremental cost.

Second, terminal dues may distort competition for *first-mile handling* of cross-border letter post items. Because terminal dues are not available to non-designated operators, non-designated operators have a competitive disadvantage (paying a higher price for last-mile activities in the destination country) compared to the designated operator. In practice this could mean that a competitor to the designated operator cannot offer competitive prices for a service where it collects and transports letters to the destination country for further last-mile handling by the local designated operator. Such work-sharing is very common in many domestic mail markets, e.g., in the United States. Distorted competition

50 C-209/10, Post Danmark

51 European Commission (2009), Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings

for first-mile handling of cross-border letter post items creates dynamic inefficiency and can also lead to productive inefficiency if the competing operator is more efficient than the designated operator.

Third, by reducing the price paid by consumers for cross-border delivery of letter post items below the level that would emerge in a free market without intervention, terminal dues may disproportionately increase the demand for delivery services covered by the terminal dues system. One example of this is an increased demand for delivery of packets (often with a registry service) delivered by the designated operators as a substitute for parcels with track and trace features delivered by global (non-designated) operators. Disproportionately increased demand for delivery services covered by the terminal dues system will result in allocative inefficiency where too many cross-border items are sent as packets and too few items are sent as parcels. This problem is particularly relevant for e-commerce and low value shipments below two kilograms, which can be sent as either packets or parcels.

Fourth, terminal dues may lead to excessive cross-border volumes. Terminal dues may distort global bulk mail and e-commerce flows by increasing the demand for cross-border delivery relative to domestic delivery. If cross-border delivery is priced disproportionately low compared to domestic delivery (as a result of low terminal dues) this may incentivize bulk mailers to inject letters in foreign countries instead of injecting them in the destination country. Similarly, disproportionately low prices for cross-border delivery may incentivize e-shoppers to buy from cross-border retailers instead of domestic ones. Distortion in demand for cross-border delivery relative to domestic delivery creates allocative inefficiencies and can also lead to productive inefficiencies—for example, if letters are injected in countries with less-efficient printing facilities leading to a waste of resources.

Fifth, terminal dues may lead to excessive cross-border delivery from transition countries. Terminal dues may increase the demand for cross-border delivery from certain countries with particularly low terminal dues (typically transition countries) relative to other countries (typically target countries). For example, instead of buying online from another target country (which, due to low terminal dues, may be preferred to buying from a domestic supplier), e-shoppers in target countries may have an incentive to buy online from a transition country (thereby enjoying even lower mailing costs due to even lower terminal dues). If the decision to buy from the transition country is triggered by disproportionately low terminal dues, this creates allocative inefficiency. It could also create productive inefficiencies if production is carried out less-efficiently than would have been otherwise.

Sixth, terminal dues may result in a transfer of money between designated operators within the UPU. The fact that terminal dues do not reflect the price for last-mile activities implies that postal operators may lose money on inbound deliveries and earn money on outbound deliveries. Depending on the difference between the terminal dues and the cost for last-mile activities, as well as the composition of letter post flows, some postal operators will be net winners whereas others will be net losers. The transfer between designated operators in the UPU may be distortionary if it spills over onto consumers (e.g., via increased taxes to fund the postal operator's loss).

An overview of the drivers of the identified distortions is provided in Table 7.

Table 7 Overview of distortions and their underlying drivers

Distortion	Driver of the distortion	Comment
Competition for last-mile handling of cross-border letter post items	Terminal dues < last-mile cost	Non-designated operators in inbound market may face predatory (below cost) pricing
Competition for first-mile handling of cross-border letter post items	Discrimination against non-designated operators	Non-designated operators in the outbound market pay more for last-mile activities than designated operators
Demand for delivery products within and outside the terminal dues system	Terminal dues < Price of domestic last-mile activities	Distorted price signals may create inefficient distribution of service products
Too much cross-border traffic	Terminal dues < Price of domestic last-mile activities	May increase the relative profitability of injecting mail in a foreign country
Too much traffic from transition countries	Discrimination against operators in target countries	May increase the relative profitability of injecting cross-border mail in a transition country
Transfer between delivery operators (spill-over to other services)	Terminal dues < Price of domestic last-mile activities	Non-alignment of compensation to costs creates winners and losers among designated operators

Source: Copenhagen Economics

An assessment of the REIMS V and bilateral agreements suggests that the these systems (as far as the terminal dues applied are closer to the price for last-mile handling of domestic letter post items) may be less distortionary than the UPU system with respect to competition for last-mile activities and distortions of global mail and trade flows. Moreover, the transfers between participating operators under these systems are generally understood to be smaller than under the UPU system. Nevertheless, due to their discriminatory nature (third party operators not having access to the rates) competition for first-mile activities may still be distorted under the alternative agreements.

2.2 Framework for analysis: Value chain approach

In order to analyze distortions created by existing terminal dues systems, we apply a value chain approach where we analyze the journey of a letter post item from sender to recipient. For each step of the value chain, we present the key decision makers, the decisions made, how these decisions are affected by terminal dues, and how the influence of terminal dues in turn produces market distortions. In order to ensure a broad and representative coverage of our analysis, we conduct the analysis for three types of letter post items:

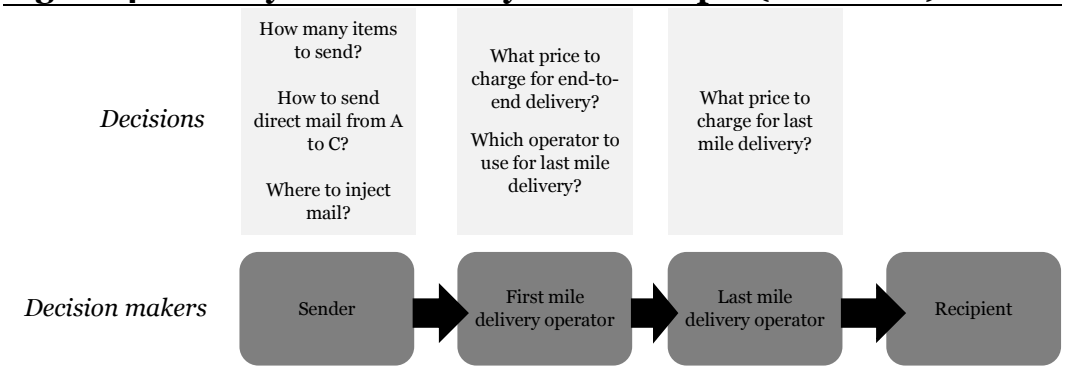
1. Business to consumer (B2C) packets, such as e-commerce or mail order packets
2. Bulk mail letters, such as direct mail or transactional bulk mail
3. Single piece letters, such as birthday cards and postcards

Figure 4 provides a stylized and simplified example of the delivery value chain of bulk mail letters from sender to recipient where a business sender (amongst other things) decides how many direct mail items to send, how to send the items from country A to country C, and where to inject the letters into the delivery chain.[52] The first-mile operator decides what price to offer for end-to-end delivery, as well as what delivery operator to en-

[52] In reality, the value chain consists of more decisions (cf. chapter 2.3).

gage with for last-mile activities in the destination country. Similarly, the last-mile operator decides what delivery services to offer and what price it should charge for these services. In this example, the recipient is a passive agent whose only task is to receive the letter (i.e., the recipient does not influence the delivery process).

Figure 4 Journey of a letter: Stylized example (bulk mail)

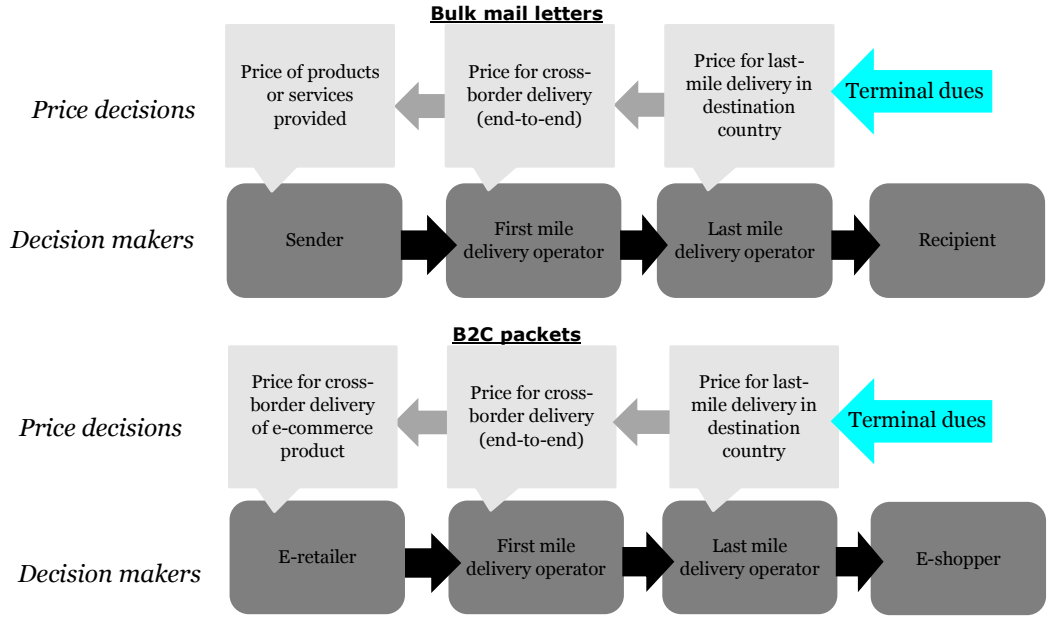


Source: Copenhagen Economics

As the diagram above shows, the decisions made by the agents in the value chain are interlinked. For example, the sender's decision of where to inject its direct mail items (in country A, B, or C) will depend on the available delivery options and their corresponding prices (determined by first and last-mile operators in the different countries). Similarly, the first-mile operator's decision concerning which operator to engage for last-mile activities will depend on the different delivery options and prices offered by last-mile operators.

Terminal dues enter this chain of decisions because terminal dues determine the payment between postal operators for last-mile handling of cross-border letters. In this way, terminal dues will have a direct impact on the decisions made by last-mile operators (what prices and conditions to offer for last-mile activities) and first-mile operators (what delivery operator to engage with and what prices to charge for cross-border delivery). If low terminal dues are reflected in low prices paid by senders for cross-border delivery, terminal dues may also have an indirect impact on the decisions made by senders (such as the decisions of which delivery operator to engage with and where to inject items). If delivery is an important input for the sender, terminal dues may also affect the prices charged for the senders' own products or services. This may for example be the case for e-commerce, where the level of terminal dues may affect the prices charged by e-retailers for delivery (or the product price in case delivery is offered for free). As a result, the level of terminal dues may have an impact on e-shoppers' decisions regarding from which country to order items online. Figure 5 illustrates how terminal dues affect the prices and decisions along the value chains for bulk mail letters and B2C packets.

Figure 5 Effects of terminal dues on prices in the value chain



Note: End-to-end delivery means the delivery from sender to recipient

Source: Copenhagen Economics

According to standard economic theory, the competitive situation will determine the extent to which a supplier in the value chain passes on a cost increase/reduction (e.g., due to terminal dues which are higher/lower than the price for last-mile handling of domestic letter post items) to its customers in terms of a higher/lower price.

Whereas fierce competition will imply zero pass-on of a price increase from a firm to its customers (full pass-on of a price reduction)[53], a monopoly situation (with constant marginal cost and linear demand) will imply a 50 percent pass-on to customers.[54] The 50 percent outcome is the result of a trade-off made by the monopolist wanting to maximise its margin (by increasing the price) while at the same time minimising the loss of sales (due to the increase in price). Whether the actual outcome is 50 percent pass-on, or slightly higher or lower, depends on factors such as the price sensitivity of customers (determining the shape of the demand curve).[55]

Thus, there is only a small likelihood that the impact of terminal dues at the level of last-mile delivery will be fully passed-on to agents further down the value chain.

53 With perfect competition, individual firms have no scope to pass through firm-specific cost changes. This implies that the firm-specific pass-on rate will be zero.

54 When marginal costs are constant, the pass-on rate will be determined by the ratio of the slope of demand to the slope of marginal revenue. In case of linear demand, the slope of demand is half the slope of marginal revenue. In this case, the monopoly pass-on rate is 50 percent.

55 In an oligopoly situation with Bertrand (price) competition between differentiated goods and linear demand, firm-specific pass-on rates decreases as the number of firms in the market increases (converging to the 50 percent monopoly pass-on when the number of firms get large).

2.3 Distortions created by terminal dues

In the following, we present the result of our value chain analysis. We focus on one step at a time in the value chain, beginning with the last-mile phase where terminal dues have the most direct impact.

Distortions of decisions in the last-mile phase

When analysing potential distortions in the last-mile phase, we need to take into account that there are two types of last-mile operators: designated operators (with access to UPU terminal dues) and non-designated operators (without access to UPU terminal dues).

The key decisions for these operators, related to terminal dues, are:

- Which last-mile options to offer for domestic and incoming cross-border mail
- What prices and conditions to offer for last-mile activities

Our assessment of the current terminal dues system reveals two main distortions in relation to last-mile operators' decisions:

- Distorted competition for last-mile handling of cross-border mail
- Under-compensation of last-mile handling of inbound cross-border mail

Distortion of competition for last-mile handling of cross-border mail

Expectations about profitability drive a non-designated operator's decision to compete for last-mile handling of cross-border mail. One determinant of expectations about profitability is the price that the designated operator charges for the competing service, i.e., last-mile handling of cross-border letter post items. Since terminal dues determine the price paid by foreign designated operators for last-mile activities, this price will also have an impact on how much a non-designated operator can charge for a last-mile service.

If terminal dues are less than the long-run average incremental cost[56] for last-mile activities, an as-efficient operator with the same costs as the designated operator will not be able to compete in a profitable way with a designated operator for last-mile handling of mail from foreign designated operators.[57] As a result, terminal dues less than the long-run average incremental cost for last-mile activities distort efficient competition and cause dynamic inefficiency.

The distortion of competition for last-mile activities is limited to liberalized markets and market segments. There are still many countries with a monopoly for ordinary letters. Countries with liberalized postal sectors include EU28 and New Zealand. In most of the remaining 163 UPU member countries there is no competition on last mile delivery of ordinary letters.[58]

---

56 The long run average incremental cost is the (long run) additional costs associated with the provision of a specific product. It is calculated as the average of all (fixed and variable) costs that a company incurs to produce a particular product (including product-specific fixed costs).

57 Failure to cover LRAIC indicates that a firm is not recovering all the (attributable) fixed costs of producing the good or service in question and that an equally efficient competitor could be foreclosed from the market. Cf. European Commission (2009), p. 5

58 Small packets, newspapers, magazines and catalogues are sometimes understood as letter post but are normally not covered by letter monopoly.

Moreover, in most European countries, the designated postal operators have market shares well above 95 percent in terms of volume and revenues. In some domestic letter post markets, delivery competition with market shares above five percent exists, notably in Bulgaria, Croatia, Germany, Italy, the Netherlands, Poland, Spain and Sweden.[59] This suggests that last-mile activities often are not attractive for competitors. The fact that parcel and express markets are significantly less concentrated[60], however, indicates that distortions could emerge in relation to last-mile handling of packets (which often can be substituted by parcel or express delivery).

Under-compensation of last-mile handling of cross-border letter post items
The UPU terminal dues system aims to be country-specific and cost-reflective. However, due to caps, floors, and discounts provided to transition country operators, this is not the case.

If terminal dues are lower than the cost[61] of last-mile handling of cross-border letter post items, then the last-mile operator may make a net loss on incoming cross-border items. Disproportionately low terminal dues on specific (costly) last-mile services, such as registered letters and packets – often used for e-commerce shipments -, create large losses.

In some countries, designated operators may request compensation for the loss incurred on inbound letter post if the losses contribute to the net cost of the universal service obligation. If compensation is granted by the state and funded with tax money, this could lead to a distortionary spill-over effect on consumption in other parts of the society), thereby leading to allocative inefficiency.

The concern about a subsidy between designated postal operators leading to spill-over effects on consumers is primarily relevant for high cost target countries that are net importers of letter post items, such as Norway.[62] Previous estimates of the magnitude of the subsidy suggest that the total transfer from "losers" to "winners" within group 1.1 could be as high as SDR 276 million (corresponding to 418 million USD in 2014.[63] These results are discussed further in chapter 4.

---

59 WIK Consult (2013), Main developments in the postal sector, pp. 165, 237

60 In many countries the three largest parcel and express operators achieve a combined market share above 60 percent, Cf. WIK Consult (2013), Main developments in the postal sector, pp. 165, 237

61 If terminal dues are lower than the average incremental cost of last mile delivery, this implies that the cost for the postal operator of delivering the letter is larger than the compensation received. In this case, terminal dues do not contribute to the recovery of the postal operator's fixed and common costs. If terminal dues are between the average incremental cost and the average total cost for last-mile delivery, this implies that terminal dues contribute to the recovery of fixed and common costs. Terminal dues above the average total cost imply that the postal operator makes a net profit on the last-mile delivery of cross-border letters.

62 The reason for this is that designated postal operators in target countries often are subject to terminal dues rates capped below the cost of last-mile delivery. As a result, postal operators in target countries lose money on inbound letter volumes. Net importers are most severely affected as potential gains on outbound letter volumes do not outweigh the losses incurred on inbound volumes. This has for example been discussed by Campbell (2014).

63 Campbell (2014). As the author notes, this is a very rough estimate based on a number of assumptions and excluding the unknown ameliorating effects of REIMS and bilateral agreements.

Distortions of decisions in the first-mile phase

As with last-mile activities, first-mile activities can also be conducted by different delivery operators. In addition to the national (designated) postal operator, non-designated operators (both in terms of end-to-end delivery operators and consolidators) can conduct first-mile activities such as collection, transport, and sorting of letter post items. The main decisions affected by terminal dues made by the first-mile operators are:

- Which delivery options to offer for end-to-end delivery
- At what prices and conditions to offer these services
- Which operator to engage with for last-mile handling of cross-border items

The price for last-mile activities (directly affected by terminal dues) is an important cost element for the first-mile operator. Our assessment reveals the following main distortions of first-mile operators' decisions:

- Distorted competition for delivery of outbound cross-border mail
- Distorted price-cost signals for outbound cross-border delivery

Distorted competition for delivery of outbound cross-border mail

UPU terminal dues are only available to designated first-mile operators. Low terminal dues give the designated first-mile operators a cost advantage over other first-mile operators. This distorts competition between designated and non-designated first-mile operators. As long as the market is liberalized, discrimination between designated and non-designated operators may result in less competition in first-mile activities and thereby dynamic and productive inefficiency.

In addition, if low terminal dues spill over in low prices for cross-border delivery of letter post (including packets) it will reduce demand for substitute delivery products, such as parcel delivery. Thus, by affecting the demand for parcel delivery, low terminal dues may make it difficult for non-designated providers of cross-border parcel delivery to compete.

The distortion of competition for outbound delivery is only relevant for products subject competition. There is normally no competition on single-piece letters, but we are observing increasing competition on single-piece packets through e-commerce.

Distorted price-cost signals for outbound cross-border delivery

The level of terminal dues may have an impact on the price charged by the designated operator for end-to-end delivery of cross-border letter post items. However, terminal dues will only influence decisions made by senders and recipients if changes in terminal dues are passed on to the end-to-end price charged by the first-mile operator.

According to microeconomic theory, a rational and profit-maximizing delivery operator would let prices for cross-border delivery reflect costs and demand (i.e., competition). As shown earlier, the pass-on rate of cost changes will be determined by the competitive context. Whereas lower marginal costs will be directly reflected in lower prices in a situation with perfect competition, this is normally not the case in an oligopolistic or monopolistic setting. This, however, does not exclude the possibility that sub-optimal individual

rationality induces postal operators subject to less than perfect competition to set prices for cross-border delivery of letter post items close terminal dues (Box 7).

Box 7 Terminal dues and prices for cross-border mail

Pricing to maximize profits

In a situation with two cross-border delivery services, one subject to competition and one not subject to competition, the profit maximizing price for the non-competitive product will be the terminal dues plus a high mark-up. The price for competitive products will be set lower. It will be constrained by the prices offered by competing delivery operators, which depend on the competitors' cost levels (but not on terminal dues paid by the designated operator). Thus, profit maximizing pricing of cross-border delivery will not be dependent on the level of terminal dues.

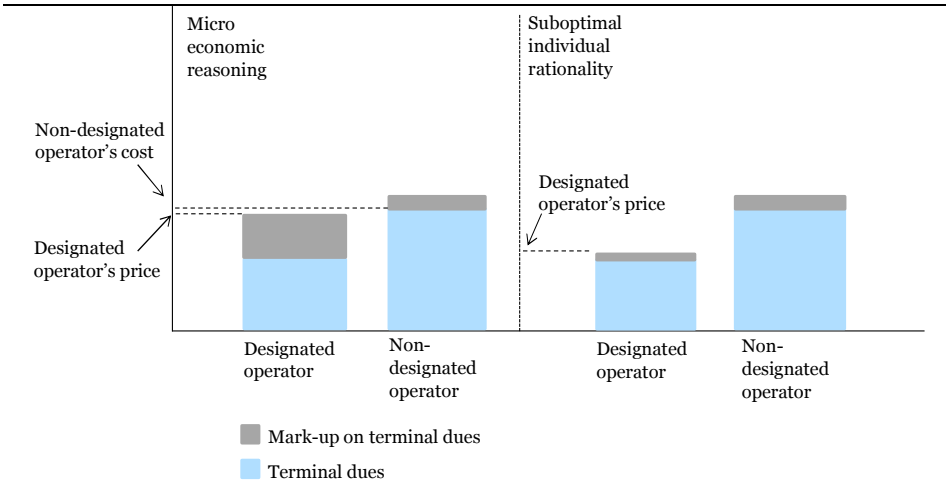
Pricing to maximize individual incentives

Pricing based on suboptimal individual rationality often arises in situations with a principal-agent problem where the party responsible for determining prices is not responsible for overall company profitability. Instead of aiming for maximized profits for the business overall, the individual goal determining the price strategy may be another, e.g., to attract higher volumes of cross-border mail in order to protect the position of the international mail department. In this situation, it may be rational for the individual to set the price for competitive products close to the terminal dues.

Comparison

The diagram below depicts two scenarios—one with pricing to maximize profits, one with pricing to maximize individual incentives. In both cases, the designated operator sets a price for a competitive service lower than its non-designated competitor. The mark-up on costs is significantly higher where the price for cross-border delivery is set just below the competitors' price.

Micro-economic reasoning versus suboptimal individual rationality



Source: Copenhagen Economics

Distortions of decisions in the buying phase

As described above, terminal dues can only distort senders' decisions when terminal dues have an impact on the prices charged by first-mile operators for end-to-end delivery of

cross-border letter post items. For the purpose of the analysis in this chapter, we depart from the assumption that there is at least some pass-on from last-mile operators to agents further down the value chain. When it comes to measuring the distortions created by terminal dues (chapter 4) an important part of the analysis will be to establish whether low/high terminal dues actually spill over into low/high prices for cross-border delivery.

When analysing the decisions of agents buying delivery services we distinguish between four different types of decision makers with different needs: (i) e-retailers and mail order firms buying delivery of packets or parcels for items weighing more or less than 2 kg; (ii) e-shoppers buying delivery of packets or parcels for items weighing more or less than 2 kg; (iii) bulk mailers buying delivery of letters with correspondence (direct mail, invoices, bank statements etc.); and (iv) small businesses or private consumers buying delivery of single-piece letters.

The main decisions made by e-retailers and mail order firms are:

- Which products to sell
- To which destination(s) to offer shipping
- What delivery option(s) to offer and what price to charge e-shoppers
- With which delivery operator(s) to engage
- Where to locate the warehouse or production of goods sold

The main decisions made by e-shoppers are:

- Where to buy the product (online or in a physical store, domestically or abroad)
- Which of the available delivery options to choose
- Whether and how to return the item bought

The main decisions made by bulk mail senders are:

- What to send (size, shape, weight)
- Where to send
- How many items to send
- Where to inject the letters
- With which delivery operator(s) to engage

The main decisions made by senders of single-piece letters are:

- What delivery option to choose
- With which delivery operator to engage

These decisions are to a large extent driven by prices and conditions for different delivery options. These may, in turn, be affected by the level of terminal dues. Although the decisions made by these different types of agents differ to some extent, we find that the distortions created by the UPU terminal dues system are very similar and can be grouped into four categories:

- Excessive demand for cross-border delivery
- Inefficient remail
- Too-high demand for services within the UPU framework
- Inefficient location of warehouses, production and printing

Too-high demand for cross-border delivery
E-retailers and mail order firms decide which shipping options to offer their customers (including to which countries they ship). Low terminal dues reflected in low prices for end-to-end cross-border delivery may incentivise retailers to offer their products to foreign markets due to the competitive advantage created by low shipping costs.

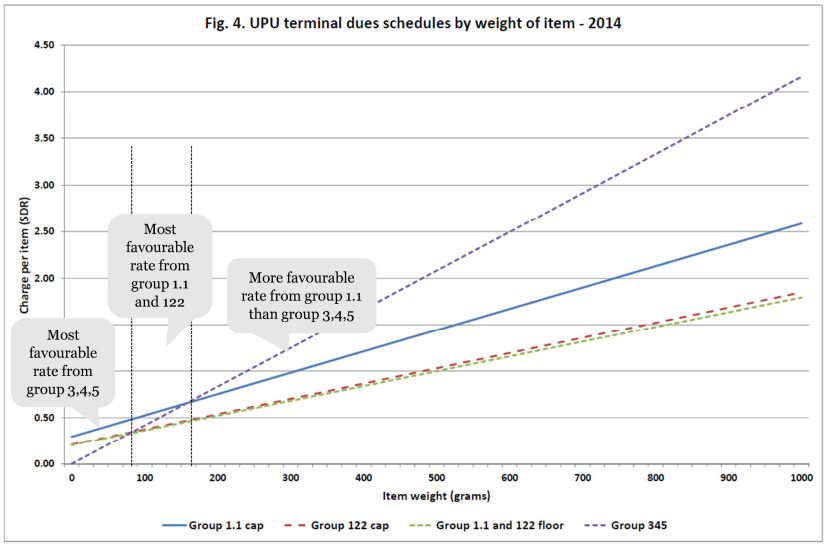
Low terminal dues reflected in low prices for cross-border delivery may incentivize consumers to buy products cross-border (from specific countries) instead of domestically, thereby leading to allocative inefficiency. This may also distort competition between retailers (brick-and-mortar as well as e-retailers) in countries with different levels of terminal dues, thereby leading to productive inefficiency.

For bulk mailers, terminal dues may distort the incentives surrounding the decision of how many items to send. Low terminal dues resulting in an artificially low price for cross-border delivery of letters may incentivize businesses to send more letters cross-border, thereby resulting in allocative inefficiency.

Inefficient remail
Terminal dues may distort the incentives surrounding the decision of where to inject letter post items. Low terminal dues may incentivize bulk mailers to inject letters destined for the domestic market (A) in a foreign country (B) making the shipment a cross-border one (ABA remail). Low terminal dues may also induce injection of cross-border letters (from country A to country C) in a transition country (B) to take advantage of low terminal dues (ABC remail). Sometimes, there are good reasons to inject letters in a foreign country. This is the case, for example, if printing, packaging, or franking (e.g., due to lower labour costs) is cheaper in the foreign country, or if the foreign country offers possibilities in terms of advanced technologies. However, sometimes, the decision to inject letters in a foreign country is inefficient. This, for example, is the case if the cost of injecting letters cross-border is higher than the cost of injecting letters domestically. In this case, the decision to inject letters cross-border (driven by low terminal dues) will result in a distortion of allocative and possibly also productive inefficiency.

Inefficient injection of letters appears to be a real but stable concern. However, inefficient injection of e-commerce packets is potentially a growing concern. The fact that UPU terminal dues vary across the different groups of postal operators depending on the weight of items sent (Figure 6) may (at least in theory) make it profitable to inject lighter e-commerce items in countries belonging to groups 3, 4, and 5, whereas heavier items are injected more profitably in countries belonging to groups 1.1 or 1.2.

Figure 6 UPU terminal dues schedule by weight of item



Source: Jim Campbell

Too-high demand for services within the UPU framework

E-retailers decide which delivery options to offer their customers. Low terminal dues for letter post items may, if they spill over into low prices charged by the first-mile operator, incentivize e-retailers to ship items below two kilograms as packets instead of shipping them as parcels. By the same token, disproportionately low prices for cross-border letter mail delivery may incentivize e-shoppers or single piece senders (sending items up to 2 kilograms) to buy a packet delivery service instead of an express or standard parcel delivery service. E-retailers could also be incentivized to split up large orders into several batches in order to be able to use the less expensive packet delivery service. Such decisions reduce demand for parcel delivery and may result in allocative inefficiency.

The hypothesis that low terminal dues spill over in disproportionately low prices for cross-border delivery of packets from transition countries is confirmed when looking at the website of one of Asia's largest e-commerce platforms – AliExpress. When investigating the delivery options for orders of different weights, we discovered that orders under two kilograms often are offered with free delivery with a designated operator. As soon as the order exceeds two kilograms, shipping becomes more expensive (Box 8).

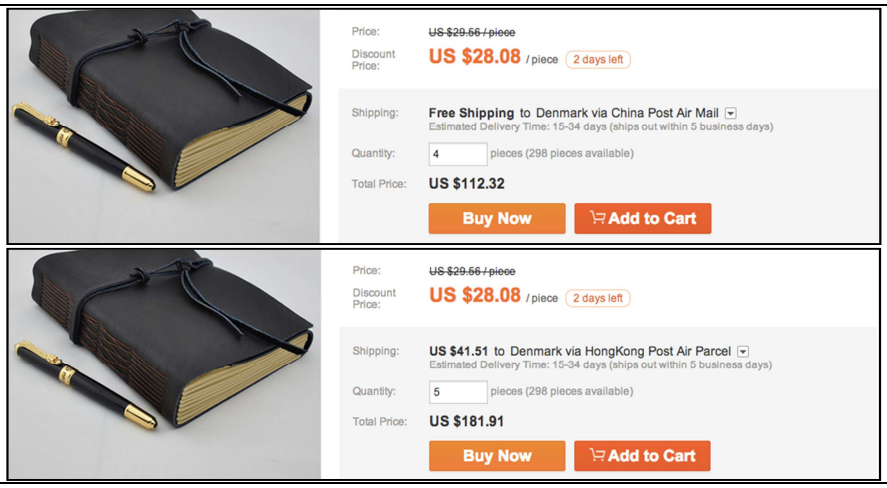
Box 8 Case: Terminal dues spilling over in delivery costs

A shopping test carried out on the Asian market place AliExpress reveals that the delivery of e-commerce packets below two kilograms often is disproportionately cheap.

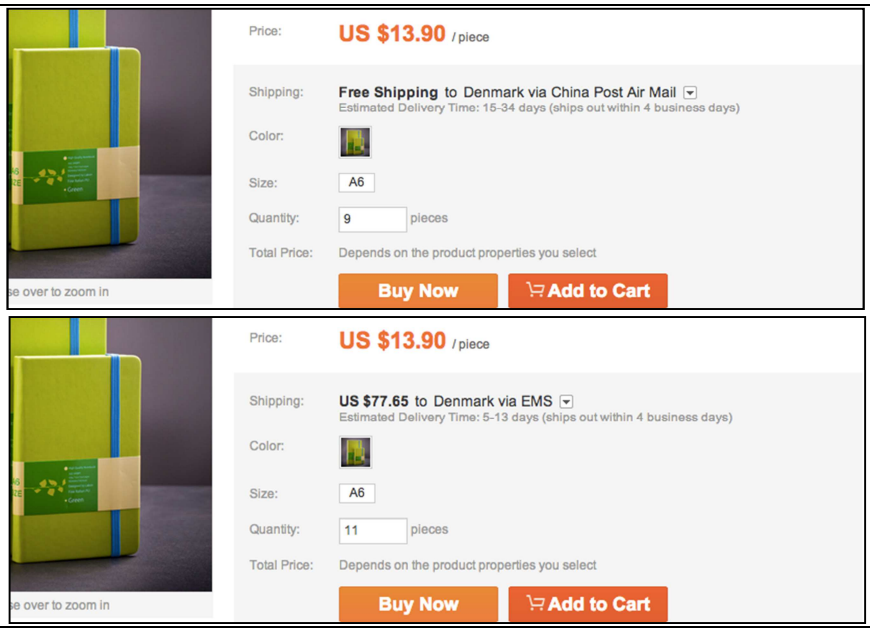
Most notably, the option of free shipping was no longer available when the order size rose above two kilograms. Thus, the marginal price of adding another unit to the basket, achieving a total weight above two kilograms, was disproportionately high.

As a result, customers and retailers may benefit from breaking down the order into smaller parts that can be shipped by letter mail.

Notebooks weighing 450 grams each



Notebooks weighing 200 grams each



Source: Copenhagen Economics, AliExpress.com

The distortion of demand for packets and parcels is a potentially large and growing concern. Global e-commerce is expected to grow by 15-20 percent per year from 2014 to 2017.[64] According to the UPU, 80 percent of mail items generated by e-commerce weigh below 2 kg and are processed in the letter post stream.[65] Similarly, large online market places estimate the share of e-commerce shipments weighing less than two kilograms to be 70-80 percent, while the share of items of low value (without need for a track and trace service) is estimated to be 60-70 percent. Items up to two kilograms without need for track and trace can be sent as either packets or parcels. Some postal operators offer track and trace on registered letter post items In these cases, registered packet delivery could constitute a viable substitute to parcel delivery, even for more valuable items. We therefore conclude that a large share of e-commerce could be affected by the distortion created by low terminal dues for cross-border packet delivery.

Inefficient location of warehouses, production, and printing
In deciding where to locate the warehouse, production, or point of injection for products, low terminal dues may incentivize e-retailers and mail order firms to locate their warehouses or production sites in transition countries. Decisions to locate warehouses or production sites in transition countries may result in allocative and productive inefficiency. Low terminal dues may also incentivize e-retailers to inject letters and packets in certain countries depending on their weight. Injection of letters and packets in certain countries based on their weight may not be the most efficient production process, which implies the creation of productive inefficiency.

Terminal dues may also distort bulk mailers' incentives surrounding the decision of where to print materials. As a consequence, businesses engaged in printing may be incentivized to locate printing facilities in transition countries in order to senders who want to take advantage of low postal rates. Locating printing facilities in transition countries may not be the most efficient production process, thereby resulting in productive inefficiency.

Spill-over effects of low terminal dues on sectors such as warehousing and production of e-commerce items are most likely small. According to industry experts, the most important deciding factor for the location of warehouses and production is shipping time and reliable service, not cost.

Summary of distortions created by UPU terminal dues
The distortions identified in this chapter can be summarized in six categories (Table 8):

- Competition for last-mile handling of cross-border letter post items
- Competition for first-mile handling of cross-border letter post items
- Demand for delivery services within and outside the UPU framework
- Global mail and trade flows, both domestic and cross-border
- Global mail and trade flows between target and transition countries

64 UPU (2014), "Fulfilling the global e-commerce promise"
65 UPU website, "About Letter Post Development", http://www.upu.int/en/activities/letter-post-development/about-letter-post-development.html

- Transfers between designated delivery operators created by under-compensation of delivery costs[66]

Table 8 Overview of distortions created by UPU terminal dues

Distortions	First-mile operators	Last-mile operators	Senders
Distortion of competition for last-mile handling of cross-border letter post items		Distorted competition for delivery of inbound cross-border mail	
Distortion of competition for first-mile handling of cross-border letter post items	Distorted competition for delivery of outbound cross-border mail		
Distortion of demand for delivery products within and outside the terminal dues system			Too-high demand for services within the UPU framework
Distortion of global mail and trade flows, domestic and cross-border			Too-high demand for cross-border delivery Inefficient remail Inefficient location of warehouses, production and printing
Distortion of cross-border mail and trade flows between target and transition countries			Inefficient remail Inefficient location of warehouses, production and printing
Transfer between delivery operators (spill-over to other services)		Under-compensation of last-mile handling of inbound cross-border mail	

Source: Copenhagen Economics

2.4 Distortions created by alternative terminal dues systems

To determine whether alternative systems for terminal dues create the same or similar distortions as the UPU system, we look to whether the underlying drivers for the distortions identified in the previous chapter are present also in the alternative systems.

REIMS

Our analysis shows that REIMS V overall seems to be less distortionary than the UPU system (Table 9).

[66] Transfers between delivery operators are only distortionary if they create spill-over effects (e.g., higher taxes to fund postal operators' losses or higher postal tariffs to rebalance losses on inbound mail).

Table 9 Distortions created by REIMS

Potential distortions	Distortion potentially present in REIMS?	Comment
Distortion of competition for last-mile handling of cross-border letter post items	Maybe	REIMS rates above LRAIC of last mile delivery ensure that third party operators can compete for last-mile activities.
Distortion of competition for first-mile handling of cross-border letter post items	Yes	REIMS is not available to third-party operators in practice
Distortion of demand for delivery products within and outside the terminal dues system	Maybe	If letter/packet delivery is disproportionately cheaper than parcel delivery
Distortion of global mail and trade flows, domestic and cross-border	Yes	Size of distortion depends on how close REIMS rates are to the price of last-mile handling of domestic letter post items
Distortion of cross-border mail and trade flows between target and transition countries	Yes	Size of distortion depends on how close REIMS rates are to the price of last-mile handling of domestic letter post items
Transfer between delivery operators (spill-over to other services)	No	REIMS rates closer to the price for last-mile handling of domestic letters reduce the likelihood of under-compensation and spill-over effects.

Source: Copenhagen Economics

Although the terms and conditions of the REIMS agreement are not publicly available, our interviews with postal operators have revealed that REIMS rates in general are higher than UPU rates. This also includes the more preferential rates in REIMS East granted to postal operators in Eastern Europe as a transition from UPU rates to the higher REIMS rates.

Based on the assumption that terminal dues under REIMS V are above the long-run average incremental cost for last-mile activities, we establish that as-efficient competitors to the designated operator can compete for last-mile handling of cross-border letter post.

However, the fact that REIMS terms and conditions are only available to members of the IPC implies that REIMS V may distort competition for first-mile handling of cross-border letters. The European Commission's ruling in 2003 required REIMS II to allow access to third-party operators at non-discriminatory conditions. If the same ruling were to apply to REIMS V, and if this condition were to be enforced in practice, then the competitive situation for first-mile activities would improve.

In REIMS II, terminal dues were set to 80 percent of the domestic tariff for a priority letter. In a study about postal operators' pricing behaviour, conducted on behalf of the European Commission in 2011, we found that single piece items (on average) were priced over 45 percent higher than transactional bulk mail and bulk mail was priced almost 50 percent higher than direct mail.[67] This suggests that a 20 percent discount on single piece tariffs may not be enough for terminal dues to equal the price of a comparable domestic delivery service. If REIMS rates (i.e., the prices for last-mile handling of cross-border letter post items) are not aligned with the prices for last-mile handling of comparable[68]

[67] Copenhagen Economics (2011), Pricing behaviour of postal operators, p. 14
[68] Comparable with respect to the level of costs incurred

domestic letter services, this implies that the system does not eliminate distortions of demand between products within and outside the terminal dues system and distortions of global mail and trade flows.

The impact of the REIMS system on transfers between designated operators depends on how close REIMS rates are to the price of last-mile handling of domestic letters. If REIMS rates are close to this price, it implies that postal operators most likely are compensated for the cost of last-mile activities and that the risk of spill-over effects on other parts of the economy (e.g., in terms of higher taxes to fund the under-compensation) is low.

Bilateral agreements

Bilateral agreements are negotiated when designated postal operators do not want to apply the terminal dues prescribed by UPU or REIMS. The bilateral negotiations are influenced by the level of the UPU rates, because UPU rates serve as the fall-back solution if negotiations break down. This creates a threat point for the operator with the larger bargaining power in the negotiations.

Due to their confidential nature, it is difficult to assess whether bilateral agreements create similar or different distortions compared to the UPU and the REIMS systems. Nevertheless, if bilateral agreements allow delivery operators to agree on terminal dues reflecting market conditions (e.g., the competitive situation) this implies that many of the distortions identified above may be reduced or even eliminated (Table 10).

Table 10 Distortions created by bilateral agreements

Distortions	Bilateral agreements	Comment
Distortion of competition for last-mile handling of cross-border letter post items	Maybe	Bilateral rates above LRAIC of last mile delivery ensure that as-efficient third party operators can compete for last-mile activities.
Distortion of competition for first-mile handling of cross-border letter post items	Yes	Bilateral agreements are not available to third-party operators
Distortion of demand for delivery products within and outside the terminal dues system	Maybe	If letter mail delivery is priced disproportionately cheaper than parcel delivery
Distortion of global mail and trade flows, domestic and cross-border	Maybe	Bilateral rates closer to the price for domestic last-mile handling of comparable letter post items reduce distortions of global mail and trade flows.
Distortion of cross-border mail and trade flows between target and transition countries	Maybe	Bilateral agreements are not available to third-party operators
Transfer between delivery operators (spill-over to other services)	Maybe	Bilateral rates closer to the cost of providing for last-mile handling of cross-border letter post items reduce the risk of under-compensation for last-mile activities

Source: Copenhagen Economics

If postal operators negotiate bilateral agreements with terminal dues at a rate above the LRAIC of last mile delivery, this implies that as-efficient third party operators can compete for last-mile activities.[69]

The fact that bilateral agreements allow delivery operators to discriminate between operators based on their identity (designated or non-designated) or origin (transition or target country) implies that bilateral agreements may still create market distortions in terms of reduced competition for first-mile activities and inefficient mail and trade flows (distortions between countries that are subject to different rates). The distortion of demand between domestic and cross-border mail and trade flows, however, should be eliminated if bilateral rates reflect the price for last-mile handling of domestic letter post products that are comparable with the cross-border service in terms of processing costs.

Last, but not least, by being determined directly by the operators conducting last-mile activities, bilateral rates also reduce the risk of under-compensation and the potential spill-over effects that it may create.

[69] Given that the UPU rates often are used as a fallback option in bilateral negotiations, it is not certain that all bilateral agreements are settled at rates above the long run average incremental cost of last mile delivery.

Chapter 3

Designing a new system for terminal dues

3.1 Summary of findings

Based on our value chain analysis in chapter 2, we have identified six distortions created by the current UPU system for terminal dues. In order to design a non-distortionary terminal dues system, we need to identify the underlying drivers for the identified distortions. An in-depth analysis of the different distortions reveals three main drivers:

- Terminal dues being discriminatory (towards third-party operators and between operators within the system);
- Terminal dues deviating from the price of last-mile handling of comparable domestic letter post products;
- Terminal dues being lower than the long-run average incremental cost of domestic last-mile activities

In order to not distort incentives for agents in the value chain, a non-distortionary system for terminal dues must be non-discriminatory (rates for the same services should be applied in the same manner to all delivery operators). Moreover, non-distortionary terminal dues (i.e., the price for last-mile handling of *cross-border* letter post items) would have to equal the price for last-mile handling of comparable *domestic* letter post items[70]. Applying a principle of "the same price for the same/comparable service" will ensure that incentives throughout the value chain are economically efficient because the price difference between last-mile handling of domestic and cross-border letter post items will reflect the cost difference between these services. It will also ensure that designated operators can compete for last-mile handling of cross-border letter post. Last, but not least, in order to prevent exclusion of non-designated operators that are as-efficient (and potentially also more efficient) than the designated operators, non-distortionary terminal dues must be at least as high as the long-run average incremental cost of last-mile activities.

Table 11 shows an overview of the different conditions that terminal dues must fulfil in order to avoid distorting decisions in the value chain. It reveals that an ideal system where terminal dues are reflective of domestic prices for comparable mail products (in terms of the costs incurred in processing and handling) will eliminate all potential distortions. What constitutes a comparable mail product depends on the composition of inbound mail volumes in terms of the required treatment in the last mile and is further discussed later in this chapter.

[70] The price should equal that of a domestic service that is as comparable to the cross-border service as possible, in terms of processing costs (primarily sorting and transport), taking into account any additional costs associated with the handling of cross-border items.

Table 11 Overview of criteria for non-distortionary terminal dues

Distortion	Non-discrimination	TD ≥ LRAIC	TD = ATC	TD = Price for last-mile handling of comparable domestic letter post products
Distortion of competition for first-mile activities	N&S		S	S
Distortion of competition for last-mile activities		N	S	S
Distortion of demand from national to foreign origin				N&S
Distortion of demand from target to transition origin	N&S		S	S
Distortion of demand from parcels to packets		N		N&S
Transfer between DOs		N	S	S

Note: N=Necessary condition; S=Sufficient condition

TD=terminal dues; LRAIC=long run average incremental cost; ATC=average total cost

Source: Copenhagen Economics

Whereas the primary objective of an alternative, non-distortionary, system for terminal dues is the elimination of distortions, we also believe that an ideal system for terminal dues should adhere to a number of sound regulatory principles. Examples of such principles are regulatory objectives for postal tariffs in general, and terminal dues in particular, specified by postal sector regulatory authorities in the United States and in Europe. Moreover, the non-distortionary system should also comply with competition law.

We find that an ideal solution where terminal dues equal the prices for comparable domestic delivery services would adhere to sound regulatory principles defined by postal regulators. This requires, however, that domestic tariffs for comparable services adhere to the principles.

Despite the benefits of the ideal solution in terms of the elimination of distortions, its implementation may not be feasible. This is due to practical and political concerns.

Practical concerns relate to the risk that the ideal solution may be complex and burdensome to administer for designated postal operators and national authorities. The main challenge in this respect is the selection of the domestic letter post product or products most similar[71] to the inbound cross-border letter mix. While the UPU letter post product for which the terminal dues apply today goes up to 2 kg, comparable domestic services may span over several domestic products. For example, First-class Mail in the US only goes up to 13 ounces (0.37 kg). Moreover, the costs incurred in the last mile vary across products with different formats. Packets, for example, are (due to their bulky format) often more costly to handle than small letters or flats. As a result, finding *one* comparable domestic product may be difficult.

To overcome this challenge, one could imagine a system with (similar to the REIMS system) three terminal dues rates per country – one per letter post format (P, G, E). The fact that the REIMS system does not seem to be overly complicated to administer implies that a UPU system based on three country-specific rates would not be too complicated either (especially if rates are non-discriminatory and apply equally to all senders).

[71] In terms of processing costs

For each letter post format, members of the UPU (in cooperation with the designated operators) would have to define (for each country) a domestic last-mile service which (in terms of processes and costs) is similar to the cross-border last-mile service (based on the mix of cross-border items).[72] Thereafter, each member would need to document an average price for this service. Last, but not least, national authorities would have to ensure that designated postal operators charge the defined price for last-mile handling of cross-border letter post items, and that the price is charged to all delivery operators (irrespective of their identity or origin).

A potential challenge here is the fact that some important letter post products (such as bulk letters) in many countries are outside the scope of the universal service obligation. This means that the prices are not monitored by the national regulatory authority and that it therefore may be more difficult for the national authority to ensure compliance with the terminal dues system.

Political concerns primarily include the risk of reduced affordability of cross-border letter mail. The ideal solution implies that cross-border delivery may become more expensive for senders (especially in transition countries where operators enjoy lower rates for delivery of very light weight packets to target countries).

Another political concern may be reduced profitability of some designated postal operators who, with the new rates, pay more for outbound letter post but do not increase the prices paid by senders to the same extent. The ideal solution may imply that postal operators in transition countries experience reduced profitability due to higher costs (caused by higher terminal dues) and lower revenues (caused by declining demand). In addition to the decline in demand caused by higher tariffs, designated operators worldwide may also lose mail volumes to alternative operators. Both effects may potentially impact the sustainability of the provision of universal services.

A third political concern may relate to the competitiveness of e-retailers in transition countries. If terminal dues paid from transition to target countries increase, it may reduce the attractiveness of e-retailers in transition countries for e-shoppers in target countries. This may make UPU members in transition countries less willing to change the current system.

Last, but not least, the current discussions within the UPU regarding product/service definitions and the possibility of bringing terminal dues and inward land rates together into a common system might be an obstacle as well.

---

[72] Postal operators possess the information necessary to decide which domestic price that is most relevant. However, if the postal operators alone were given the task to decide on a price, this may lead to unfavourable outcomes (due to the fact that postal operators have the incentive to maximize their profits given the legal framework). In order to prevent this from happening, a supervisory authority (national regulator or ministry) should have the responsibility for defining the relevant domestic products (using information provided by the postal operator). In order to prevent abuse of the system, it may become necessary that UPU develops a setup for handling of complaints from postal operators regarding the terminal dues charged by operators in other countries. This authority could have the power to assess whether the terminal dues charged actually correspond to the price of a comparable domestic last-mile delivery service.

In order to cope with political concerns related to affordability of cross-border letters and sustainability of universal service provision, a practical solution could be to complement the ideal solution with an aid program for developing countries. The practical solution would imply that the ideal solution is implemented for all countries. Alongside this, a compensation scheme could be introduced for transition countries in groups 2, 3, 4, and 5 in order to ensure affordability of cross-border letter mail and sustainability of provision of universal services.

The practical solution would imply that decisions throughout the value chain remain undistorted. Nevertheless, in order to ensure that the aid scheme is effective and that the money is used as intended, the solution needs to be accompanied by rules. Rules could, for example, determine which postal products must be affordable (i.e., which mailers can be subsidised). Such rules would be necessary to prevent inefficient injection of letter post items and distorted e-commerce.

The practical solution described above does not solve the potential concern regarding reduced competitiveness of e-retailers in transition countries. In order to cope with this issue, a potential solution could be to include other trade facilitating elements in the terminal dues negotiations including trade barriers, customs, and VAT.

3.2 Drivers of distortions and proposed solutions

In order to design a system that eliminates these distortions, we need to identify the underlying drivers for the distortions identified in chapter 2. An in-depth analysis of the different distortions reveals the following three main drivers of the distortions (Table 12):

- Terminal dues being discriminatory between operators;
- Terminal dues deviating from the price of last-mile handling of comparable domestic letter post products;
- Terminal dues being lower than the long-run average incremental cost of domestic last-mile activities

Table 12 Economic distortions and their drivers

Distortion	Source of distortion	Implication
Distortion of competition for last-mile handling of cross-border letter post items	TD < Last-mile LRAIC	As-efficient NDOs in last-mile market may not be able to compete with DOs
Distortion of competition for first-mile handling of cross-border letter post items	Discrimination (DO vs. NDO)	NDOs in the first-mile market may not be able to compete with DOs
Distortion of demand between parcels and packets	TD < Price for last-mile handling of comparable domestic letter post items	Increases the incentives to send packets instead of parcels cross-border
Distortion of demand between domestic and cross-border delivery	TD < Price for last-mile handling of comparable domestic letter post items	Increases the relative profitability of injecting mail in a foreign country
Distortion of demand between target and transition origin delivery	Discrimination (target vs. transition countries)	Increases the relative profitability of injecting cross-border mail in a transition country
Transfers between DOs	TD < Price for last-mile handling of comparable domestic letter post items	Transfer of money between DOs which may spill over on other parts of society

Note: TD=terminal dues; LRAIC=long-run average incremental cost; DO=Designated operator; NDO=Non-designated operator

Source: Copenhagen Economics

In the following sections, we focus on one distortion at a time. After providing a brief description of each distortion, its implications, and the underlying driver causing the observed distortion, we demonstrate how an alternative terminal dues system could eliminate the distortion in question.

Distortion of competition for last-mile activities

Competition for last-mile handling of cross-border letter post may be distorted if the terminal dues charged by the designated operator are lower than the long-run average incremental cost of last-mile handling of cross-border items. In this case, an as-efficient non-designated operator will not be able to offer a competitive price for last-mile activities.

In theory, competition may also be distorted if the terminal dues system forces the designated operator to charge terminal dues that are higher than the competitive price offered by an as-efficient competitor for last-mile activities. In this case, a non-designated as-efficient operator would be able to undercut the terminal dues (while still making a profit) and the designated operator would not be able to offer a competitive price for last-mile activities. However, this situation would only be relevant as far as designated operators were unable to conclude bilateral agreements with lower terminal dues.

The dynamics of the distortion of competition for last-mile activities are summarised in Table 13.

Table 13 Distortion of competition for last-mile activities

Situation	First-mile operators decides which operator to use for last-mile activities
Distortion	First-mile operators decide to use a less efficient operator over a more efficient one
Implication	Less efficient operator used[1]
Underlying driver for the distortion	Terminal dues <long-run average incremental cost for last-mile activities

Note: [1] Only relevant for market segments where last-mile activities are liberalized.

Source: Copenhagen Economics

In order to explain the mechanisms underlying the distortion, we provide an example of a hypothetical situation with a designated operator and a non-designated operator competing for last-mile handling of cross-border items sent from a country A to a country B.

In the example, the designated operator incurs a cost for last-mile delivery of 0.7. The corresponding cost for the non-designated operator is 0.6. With all else being equal, the non-designated operator can provide the last-mile service more efficiently (at a lower cost) than the designated operator. Thus, the socially optimal choice would be if the first-mile operator used the non-designated operator for last-mile activities.

However, if the designated operator charges a terminal due for last-mile delivery of 0.5 (i.e., below cost) and the non-designated operator charges a cost-covering price of 0.6, first-mile operators will always have an incentive to use the cheaper (but less efficient) designated operator. This situation creates a distortion where non-designated operators who are at least as efficient as the designated operator are foreclosed from the market (Figure 7).

Figure 7 Foreclosure of as-efficient non-designated operator

	Designated operator	Non-designated operator	
Actual cost incurred by last-mile operator in Country B	0.7	0.6	→ **Efficient choice:** Use non-designated operator
Terminal dues in Country B = Cost incurred by first-mile operator for delivery to Country B	0.5	0.6	
Price paid by sender for delivery to Country B (assuming no mark-up on costs)	0.5	0.6	→ **Actual choice:** Use designated operator

Note: DO=designated operator; NDO=non-designated operator.

Source: Copenhagen Economics

To eliminate distortions of competition for last-mile activities, a necessary condition is thus that terminal dues are at least equal to the long-run average incremental cost of

last-mile activities. This allows a non-designated operator that is "as-efficient" (i.e., has the same cost level) as the designated operator to compete without losing money.

Sufficient conditions to ensure a level playing field would also be to set terminal dues equal to the average total cost of last-mile activities, or to set terminal dues equal to the domestic price for comparable last-mile activities (as long as these prices are not predatory).

Distortion of competition for first-mile activities

Competition for first-mile activities is distorted when buyers of delivery decide to use a less efficient operator over a more efficient one. The distortion may occur when the structure of terminal dues discriminates between designated and non-designated operators. In this case, an as-efficient non-designated operator may not be able to offer a competitive price for first-mile activities.

The dynamics of the distortion of competition for first-mile activities are summarised in Table 14.

Table 14 Distortion of competition for first-mile activities

Situation	Non-designated operator decides whether to compete for first-mile handling of cross-border items Buyers of delivery services (e-retailers, e-shoppers, business mailers) decide which operator to use, and which delivery options to buy or offer
Distortion	Buyers of delivery decide to use a less efficient operator over a more efficient one
Implication	Less efficient operator used*
Underlying driver for the distortion	Discrimination between designated and non-designated operators

Note: * Only relevant for products subject to potential competition (e.g., mailing houses consolidating bulk letters). Normally no competition on single piece "ordinary letters", but increasing competition on single-piece packets (e-commerce)

Source: Copenhagen Economics

In order to explain the mechanisms underlying the distortion, we provide an example of a hypothetical situation with a designated operator and a non-designated operator competing for first-mile handling of cross-border items sent from country A to country B.

In the example, the cost incurred by the designated operator for providing end-to-end delivery is 1.3 (0.3 for the first mile plus 1.0 for the last mile). Due to higher efficiency in the first-mile phase, the corresponding cost for the non-designated operator is 1.2 (0.2 for the first mile plus 1.0 for the last mile). With all else being equal, the non-designated operator can provide the first-mile service more efficiently (at a lower cost) than the designated operator. Thus, the socially optimal choice would be if the buyer used the non-designated operator for first-mile activities.

However, if the designated operator is charged a terminal due for last-mile delivery of 0.5 and the non-designated operator is charged a price of 1.0 for last-mile delivery, and if this difference is reflected in the price that the buyers of delivery services pay, buyers will always have an incentive to use the cheaper (but less efficient) designated operator. This

situation creates a distortion where non-designated operators who are at least as efficient as the designated operator are foreclosed from the market (Figure 8).

Figure 8 Foreclosure of as-efficient non-designated operator

	Designated last-mile operator	Designated first-mile operator	Non-designated first-mile operator	
Actual cost incurred by first-mile operator in Country A		0.3	0.2	→ **Efficient choice:** Use non-designated operator
Actual cost incurred by designated last-mile operator in Country B	1.0			
Terminal dues in Country B		0.5	1.0	
Cost incurred by first-mile operator for delivery to Country B = Price paid by sender for delivery to Country B (assuming no mark-up on costs)		0.8	1.2	→ **Actual choice:** Use designated operator

Source: Copenhagen Economics

One should note that this outcome is not linked to the fact that the designated operator receives a price below cost. For example, if the designated operator would pay a cost-based terminal dues rate of 1.0 and the non-designated operator would pay a rate of 1.2, this would also incentivize mailers to use the less efficient operator.

To eliminate distortions of competition for first-mile activities, a necessary condition is thus that terminal dues are non-discriminatory between the designated operator and the non-designated operator.

A sufficient condition to ensure a level playing field would thus be to set terminal dues equal to the domestic price for last-mile activities (as long as these prices are not predatory) or to set terminal dues equal to the average total cost of last-mile activities. Both solutions imply non-discrimination as long as the same rate is applied to all operators.

Figure 9 illustrates a non-distortionary situation where the same terminal dues are charged to the designated and the non-designated operator.

Figure 9 Non-distorted competition for first-mile activities

	Designated last-mile operator	Designated first-mile operator	Non-designated first-mile operator	
Actual cost incurred by first-mile operator in Country A		0.3	0.2	→ **Efficient choice:** Use non-designated operator
Actual cost incurred by designated last-mile operator in Country B	1.0			
Terminal dues in Country B		1.0	1.0	
Cost incurred by first-mile operator for delivery to Country B = Price paid by sender for delivery to Country B (assuming no mark-up on costs)		1.3	1.2	→ **Actual choice:** Use non-designated operator

Note: Here: Terminal dues = average total cost of last-mile activities. Non-discrimination would eliminate the distortion even if the terminal dues did not reflect the cost of last-mile activities.

Source: Copenhagen Economics

Distortion of demand for services within and outside the terminal dues system: Packets vs. parcels

Demand for services within and outside the terminal dues system is distorted when the buyers of delivery services opt to send items as packets (subject to terminal dues) when it would be more efficient if they were sent as parcels (subject to inward land rates). This can result in too many packets being sent, and too few parcels. The distortion may occur if the difference in prices for last-mile handling of packets and parcels (which equals the marginal benefit received by consumers who are indifferent between buying packet and parcel delivery) does not equal the difference in costs (i.e. the marginal cost incurred by producers) for last-mile handling of packets and parcels.[73] For example, some consumers might be willing to pay for the additional costs incurred in parcel delivery. In an optimal situation, these consumers should choose parcel delivery instead of packet delivery. However, if the price difference between parcel delivery and packet delivery exceeds the difference in the actual costs of providing these services, some consumers may not be willing to pay the higher price of parcel delivery. This will lead to suboptimal choices where too few customers buy parcel delivery. For this distortion to play out in reality, however, the distorted difference between price and cost for last-mile activities must spill over to the end-to-end delivery prices paid by those who make the choice between parcel and packet delivery.

If this is the case, e-retailers considering what shipping options to offer their customers may decide to offer to send items under 2 kg as packets instead of parcels, or offer to split orders totalling over 2 kg into multiple deliveries, so that each delivery can be mailed as a packet instead of a parcel. Similarly, e-shoppers who are faced with the options to buy packet or parcel delivery may prefer to buy packet delivery, although this choice is not efficient.

The dynamics of this distortion are summarised in Table 15.

[73] In economics terms, this implies that the marginal rate of substitution does not equal the marginal rate of transformation for packets and parcels.

Table 15 Distortion of demand for services within and outside the terminal dues framework

Situation	E-retailers considering what options to offer their customers for orders less than 2 kg E-retailers considering what options to offer their customers for orders more than 2 kg E-shoppers deciding what delivery service to use when buying online
Distortion	E-retailers offer packet instead of parcel delivery although this is not efficient E-retailers split purchased items totalling over 2 kg into multiple packet deliveries E-shoppers choose packet instead of parcel delivery although this is not efficient
Implication	Excessive demand for packet delivery Too low demand for parcel delivery
Underlying driver for the distortion	TD<price for comparable domestic last-mile activities

Source: Copenhagen Economics

In order to explain the mechanisms underlying the distortion of demand, we again provide an example of a hypothetical situation with cross-border items sent from a country A to a country B

In the example, the cost incurred by the designated operator for delivering a packet is 0.7. The corresponding cost for delivering a parcel is 0.9. Due to the fact that parcel delivery includes some additional features that packet delivery does not contain (e.g., track-and-trace), senders and recipients normally have a slightly higher willingness to pay for parcel delivery. In our example, senders are willing to pay 1.0 for packet delivery and 1.2 for parcel delivery. This difference in willingness to pay equals the underlying cost difference between packet and parcel delivery. If the prices for packet and parcel delivery would have been set equal to their actual costs, this would have meant that senders would be indifferent between packet and parcel delivery. Irrespective of which service they would buy, they would be equally well off.

However, if the price for sending a parcel is 1.0 and the price for sending a packet is 0.6 (due to the level of terminal dues), this means that packet delivery is priced disproportionately low (0.4 lower than parcel delivery). E-retailers and e-shoppers will therefore always have an incentive to buy packet delivery. This situation creates a distortion where too many items are sent as packets instead of as parcels (Figure 10).

Figure 10 Distortion of demand for services within and outside the terminal dues framework

	Parcel	Packet	Difference	
(a) WTP	1.2	1.0	0.2	
(b) Actual cost incurred by last-mile operator in Country B	0.9	0.7	0.2	
(c) Total surplus = (a-b)	0.3	0.3		→ **Efficient choice:** Sender indifferent between packet and parcel
(d) Terminal dues /inward land rate = Cost incurred by first-mile operator for delivery to Country B = Price paid by sender for delivery to Country B (assuming no mark-up on costs)	1.0	0.6	0.4	
(e) Consumer surplus = (a-d)	0.2	0.4	0.2	→ **Actual choice:** Preference to send packet

Note: Socially optimal choice occurs when the price difference between parcel delivery and packet delivery = cost difference between parcel delivery and packet delivery

For the sake of simplicity, this example assumes that the costs incurred in the first mile are zero.

WTP=willingness to pay

Source: Copenhagen Economics

To eliminate distortions of demand for services within and outside the terminal dues system, a necessary condition is that the price difference between parcel delivery and packet delivery should equal the cost difference between the two services. This will ensure that consumers switch if their benefit from switching from one product to another exceed the cost to producers of switching production. It is also necessary that terminal dues for packets are at least equal to the long-run average incremental cost of providing last-mile handling of bulk packets. If this is not the case, providers of parcel delivery would not be able to compete due to the under-priced packet delivery service.[74]

If there is no distortion in domestic delivery prices, the conditions above will be fulfilled if terminal dues equal the domestic price for last-mile handling of comparable packet delivery services. If domestic prices are distorted (e.g., through a disproportionately low price for packet delivery compared with parcel delivery), setting terminal dues equal to the price for last-mile handling of domestic packets would not create any additional distortion.

Figure 11 illustrates a non-distortionary situation where the price difference between parcel delivery and packet delivery equals the cost difference. In this example, the terminal dues is set equal to the price for domestic last-mile handling of packets, where the designated operator generates a mark-up of 0.1 on costs. This means that the terminal dues for sending a packet to country B are 0.8 (0.7 plus 0.1). The 0.1 mark-up on costs for last-mile handling of packets equals the mark-up on costs for last-mile handling of parcels (resulting in an inward land rate for parcel delivery of 1.0).

[74] This requires, however, that low terminal dues spill over to low end-users by increasing their prices.

Figure 11 Non-distorted demand for services within and outside the terminal dues framework

	Parcel	Packet	Difference	
(a) WTP	1.2	1.0	0.2	
(b) Actual cost incurred by last-mile operator in Country B	0.9	0.7	0.2	
(c) Total surplus = (a-b)	0.3	0.3		→ **Efficient choice:** Sender indifferent between packet and parcel
(d) Terminal dues /inward land rate = Cost incurred by first-mile operator for delivery to Country B = Price paid by sender for delivery to Country B (assuming no mark-up on costs)	1.0	0.8	0.2	
(e) Consumer surplus = (a-d)	0.2	0.2		→ **Actual choice:** Sender indifferent between packet and parcel

Note: Terminal dues =price for domestic last-mile activities.
For the sake of simplicity, this example assumes that the costs incurred in the first mile are zero.
WTP=willingness to pay

Source: Copenhagen Economics

As visible from the example above, a non-distortionary situation does not necessarily require that the price for last-mile handling of cross-border items is equal to the underlying cost (i.e., zero mark-up on costs). Distortions would be eliminated as long as the relationship between prices (including any mark-up on costs) reflects the relationship between actual costs incurred.

Distortion of global mail and trade flows

Global mail and trade flows are distorted when e-shoppers, e-retailers, print houses, and large mailers decide to buy, send, or locate their business activities cross-border instead of domestically, even though this would not be cost-efficient (i.e., where the additional costs of buying, sending, or locating business activities cross-border are offset by an artificially low price for sending cross-border mail). This can result in excessive cross-border mail and trade, as well as inefficient location of print houses, warehouses, and production.

Global mail and trade flows are also distorted when senders of cross-border mail or buyers of cross-border delivery services decide to inject mail or buy delivery in a transition country instead of in a target country. One example of this would be an e-shopper in Denmark who (due to the lower terminal dues rate on items shipped from transition countries) choses to buy online from China instead of buying online from France.

The underlying reason for distortions of global mail and trade flows are terminal dues which do not reflect the price for last-mile handling of comparable domestic letter post items.

The dynamics of this distortion are summarised in Table 16.

Table 16 Distortion of global mail and trade flows

Distortion of decision to buy domestically or cross-border	
Situation	E-shoppers consider whether to buy from an e-retailer domestic or abroad E-retailers consider whether to locate warehouse/production domestic or abroad E-retailers consider what customers to serve (domestic and/or foreign) Print houses consider to locate printing facilities domestic or abroad Large mailers consider whether to print and inject invoices to its domestic clients via the domestic postal operator or via a postal operator abroad
Distortion	Decision to buy/send/locate activities cross-border although this decision is inefficient
Implication	Too much cross-border mail Too much cross-border trade Inefficient location of print houses/warehouses/production
Underlying driver for the distortion	TD<price for comparable domestic last-mile activities
Distortion of decision to buy from transition or target country	
Situation	E-shoppers deciding which foreign country (target or transition) to order from
Distortion	E-shopper choose to buy from transition country, because shipping will be relatively less costly although this decision is inefficient (less costly to ship from target country)
Implication	Inefficient mail and trade flows
Underlying driver for the distortion	Discrimination between operators in target and transition countries

Source: Copenhagen Economics

In order to explain the mechanisms underlying the distortion of global mail and trade flows, we provide two examples. The examples outline a hypothetical situation with a buyer's decision of (i) whether to purchase domestic or cross-border delivery and (ii) from which foreign country to purchase cross-border delivery.

In the first example, the buyer decides whether to purchase delivery domestically (in country A) or cross-border (country B). The cost for end-to-end domestic delivery is 0.9. The end-to-end cost incurred for cross-border delivery is 1.0 (cost for first-mile activities in country B plus the cost for last-mile activities in country A). With all else being equal, the items in question can be sent most efficiently (at lowest cost) domestically. Thus, the socially optimal choice would be if the buyer decided to purchase domestic delivery.

However, if the price of end-to-end domestic delivery is 0.9, and the price of cross-border delivery is 0.7 (cost for first mile in country B plus the terminal due in country A) buyers will always have an incentive to use the cheaper (but less efficient) sending method. This situation creates a distortion where too much mail is sent cross-border (Figure 12).

Figure 12 Distortion of decisions to buy domestic vs. cross-border

	Domestic delivery (A)	Cross-border delivery (B → A)	
Actual cost incurred by first-mile operator	0.1	0.2	→ **Efficient choice:** Print mail in A
Actual cost incurred by last-mile operator	0.8	0.8	
Terminal dues in Country A		0.5	
Cost incurred by first-mile operator for delivery within/to Country A = Price paid by sender for delivery within/to Country A (assuming no mark-up on costs)	0.9	0.7	→ **Actual choice:** Print mail in B and send to A

Source: Copenhagen Economics

In the second example, the buyer decides whether to purchase cross-border delivery from a target country (B) or from a transition country (C). The end-to-end cost incurred for cross-border delivery from country B is 0.9 (first-mile cost in country B plus last-mile cost in country A). The end-to-end cost incurred for cross-border delivery from country C is 1.0 (first-mile cost in country C plus last-mile cost in country A). With all else being equal, the items in question can be sent most efficiently (at lowest cost) from country B. Thus, the socially optimal choice would be if the buyer decided to purchase from country B.

However, if discriminatory terminal dues imply that the cost for the first-mile operator in country B is 0.6[75], and the cost for cross-border delivery from country C is 0.5[76], and if this cost difference is reflected in the prices paid by buyers of delivery services, buyers will always have an incentive to use the cheaper (but less efficient) sending method. This situation creates a distortion with inefficient mail and trade flows (Figure 13).

It should be noted that a distortion would occur also in a case where the terminal dues from both countries were above the cost of last-mile activities.

[75] Cost for first-mile in country B plus terminal dues in country A
[76] Cost for first-mile in country C plus terminal dues in country A

Figure 13 Distortion of decisions to buy cross-border

	Cross-border delivery from B	Cross-border delivery from C	
Actual cost incurred by first-mile operator	0.1	0.2	→ **Efficient choice:** Purchase from B
Actual cost incurred by last-mile operator	0.8	0.8	
Terminal dues in Country A	0.5	0.3	
Cost incurred by first-mile operator for delivery to Country A = Price paid by sender for delivery to Country A (assuming no mark-up on costs)	0.6	0.5	→ **Actual choice:** Purchase from C

Source: Copenhagen Economics

To eliminate distortions of global mail and trade flows, a necessary condition is to set terminal dues equal to the domestic price for last-mile handling of comparable letter post items. This would mean that the price difference between cross-border deliver and domestic delivery would equal the cost difference between the two services.

This implies that all foreign delivery operators must receive the same prices and conditions for last mile delivery and that these prices and conditions should equal those for domestic mailers[77]. Figure 14 illustrates a non-distortionary situation where the price difference between domestic and cross-border delivery will equal the cost difference.

Figure 14 Non-distorted decisions to buy domestic or cross-border

	Domestic delivery (A)	Cross-border delivery (B → A)	
Actual cost incurred by first-mile operator	0.1	0.2	→ **Efficient choice:** Print mail in A
Actual cost incurred by last-mile operator	0.8	0.8	
Terminal dues in Country A		0.8	
Cost incurred by first-mile operator for delivery within/to Country A = Price paid by sender for delivery within/to Country A (assuming no mark-up on costs)	0.9	1.0	→ **Actual choice:** Print mail in A

Note: Here, terminal due equals the price for domestic last-mile activities which, in turn, equals the actual cost for domestic delivery (first-mile plus last-mile).

Source: Copenhagen Economics

To eliminate distortions of decisions to buy cross-border delivery from target vs. transition countries, a necessary condition is non-discrimination between delivery operators in different countries. However, non-discrimination will not eliminate the distortion of decisions to buy domestic or cross-border.

A sufficient condition which would solve both distortions would thus be to have terminal dues set equal to the tariff for last-mile handling of comparable domestic delivery ser-

[77] Prices for cross-border last-mile delivery should, however, be adjusted for any increased costs related to the handling of cross-border items.

vices[78]*. This involves an implicit non-discrimination requirement*. Figure 15 illustrates this non-distortionary situation where the price difference between parcel delivery and packet delivery will equal the cost difference.

Figure 15 Non-distorted decisions to buy cross-border

	Cross-border delivery from B	Cross-border delivery from C	
Actual cost incurred by first-mile operator	0.1	0.2	→ **Efficient choice:** Purchase from B
Actual cost incurred by last-mile operator	0.8	0.8	
Terminal dues in Country A	0.5	0.5	
Cost incurred by first-mile operator for delivery to Country A = Price paid by sender for delivery to Country A (assuming no mark-up on costs)	0.6	0.7	→ **Actual choice:** Purchase from B

Note: Here, terminal dues are the same for operators in target and transition countries (but still below cost)

Source: Copenhagen Economics

Transfers between designated delivery operators

If terminal dues are lower than the actual cost for last mile delivery, this implies that postal operators (compared to a situation where terminal dues cover the cost of last-mile activities) lose money on delivery of inbound letter post items and gain money on delivery of outbound letter post items. This is not a distortion of economic efficiency *per se*.

However, financial transfers between delivery operators may result in spill-over effects. Postal operators losing money on their cross-border businesses may, for example, charge higher prices on other services, or claim a government subsidy enabled by higher taxes, thereby creating distortions.

The dynamics of the transfers between designated delivery operators are summarised in Table 17.

Table 17 Transfer between designated delivery operators

Situation	Target country designated operator must accept incoming mail from all countries Target country designated operator must send outgoing mail to all countries
Distortion	Some operators underpay for outgoing mail/are undercompensated for incoming mail Over- and under compensation should be measured relative to the situation with terminal dues reflecting the market based price
Implication	High cost operators subsidise low cost operators Spill-over effects: Countries being undercompensated may charge higher prices on other services, or receive government subsidy which may spill over in higher taxes
Underlying driver for the distortion	TD<price for comparable domestic last-mile activities

Source: Copenhagen Economics

In order to explain the mechanisms underlying the transfers between designated delivery operators, we provide an example of two hypothetical designated delivery operators.

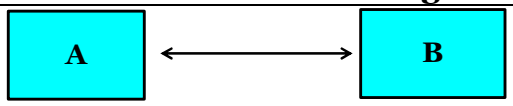
[78] Possibly adjusted for additional costs incurred in the handling of cross-border items.

In the example, two designated operators deliver cross-border mail to each other. The cost incurred by Operator A for last-mile delivery is 0.8. The cost incurred by Operator B for last-mile delivery is 0.5. The terminal dues remuneration is the same for both operators and is set equal to 0.5. We assume that terminal dues in the optimal situation would be equal to the price for domestic last-mile delivery and that this price, due to competition in the domestic mail market, would be equal to the cost of last-mile delivery. This would imply terminal dues of 0.8 for delivery to country A and a terminal dues of 0.5 for delivery to country B.

The distortion of terminal dues implies that Operator A operates at a loss of 0.3 per incoming cross-border letter, while Operator B breaks even. It also implies that Operator B pays a price for each outbound letter that is 0.3 lower than the price he would pay in the non-distorted situation.

Overall, there is a transfer of 0.3 from A to B for every letter sent from B to A (Figure 16).

Figure 16 Transfer between designated delivery operators



Cost for last mile: 0.8
Terminal due: 0.5

Cost for last mile: 0.5
Terminal due: 0.5

Inbound	Operator A	Operator B
Cost	0.8	0.5
Remuneration	0.5	0.5
Gain/loss	**-0.3**	**0**

Outbound	Operator A	Operator B
Cost	0.5	0.8
Price	0.5	0.5
Gain/loss	**0**	**0.3**

Implication: Transfer of money from A to B for every letter sent from B to A

Source: Copenhagen Economics

Due to the fact that cross-border mail flows are asymmetric (some postal operators are net importers of mail whereas others are net exporters), the terminal dues system creates "winners" and "losers" compared to a situation where terminal dues would cover delivery costs.

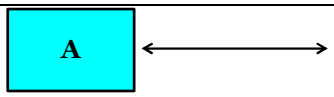
To remove the transfer, terminal dues could be set equal to the average total cost of last-mile activities. This would ensure full coverage of costs and no loss of money for postal operators. However, terminal dues equal to the average total cost may encourage entry of less efficient competitors specialising in last-mile handling of cross-border mail.

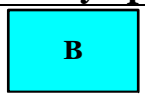
An alternative solution could be to set terminal dues equal to the price for last-mile handling of comparable domestic letter post items (adjusted for additional costs incurred in

handling cross-border items). Some postal operators (e.g., in the UK and in Sweden) have introduced geographic zoned pricing for bulk domestic mail, i.e., higher charges for areas of high delivery costs. In order to eliminate distortions, these price differences could and should be applied to inbound letter post as well. This will allow the designated operator to recover costs while setting terminal dues at a level mirroring the competitive conditions. This solution may allow some operators to achieve a high margin on last-mile activities. However, this should not pose a problem as long as prices are not excessive.

A situation where terminal dues are set equal to the price for last-mile handling of domestic items is shown in Figure 17.

Figure 17 No transfer between designated delivery operators





Cost for last mile: 0.8
Price for domestic last-mile delivery: 0.9
Terminal due: 0.9

Cost for last mile: 0.5
Price for domestic last-mile delivery: 0.6
Terminal due: 0.6

Inbound	Operator A	Operator B
Cost	0.8	0.5
Remuneration	0.9	0.6
Gain/loss	**0.1**	**0.1**

Outbound	Operator A	Operator B
Cost	0.5	0.8
Price	0.6	0.9
Gain/loss	**-0.1**	**-0.1**

Implication: No transfer between operators

Note: Here, terminal dues equal the price for domestic last-mile activities

Source: Copenhagen Economics

3.3 Designing a non-distortionary system for terminal dues

In order not to distort incentives for agents in the value chain, a non-distortionary system for terminal dues must respond to the underlying drivers for distortions identified in the previous section.

Based on the analysis conducted so far, Table 18 shows an overview of the different conditions that terminal dues must fulfil in order to avoid distorting decisions in the value chain. It demonstrates that elimination of distortions requires that the terminal dues are applied in a non-discriminatory way to all operators, irrespective of their origin or status as designated or non-designated postal operators. It also reveals that a system where terminal dues equal the prices for last-mile handling of comparable domestic letter post products (possibly adjusted for any additional costs incurred in handling cross-border items) will eliminate any potential distortions. The main reason for this is that, in order to eliminate distortions, the price differences between different delivery services should reflect the underlying cost differences between the same services. Since cross-border mail is collected and consolidated before it is injected in the last-mile network and thereafter

consolidated with domestic mail, the processes required in the last-mile operations are very similar to those for domestic letter post. For this reason, using the price for last-mile handling of domestic mail should be a good starting point. However, while it may be fairly straightforward to find a domestic letter product comparable to international letters, one should take into account that an increasing share of cross-border volumes is made up of small packets (which incur higher costs in the last mile). Thus, finding one domestic product that is comparable to the entire mix of cross-border items may be challenging. In order to reduce this problem, one could identify three terminal dues rates (one per letter post format - P, G, and E). This would allow designated postal operators to charge higher terminal dues for cross-border packets than for cross-border letters. This type of framework is already in place in the REIMS system where different terminal dues are applied for P, G, and E items. What specific domestic letter post products (within the three categories) are most similar to inbound cross-border letter post - and therefore should be used as reference products - needs further assessment on a country-by-country basis.

Table 18 Overview of criteria for non-distortionary terminal dues

Distortion	Non-discrimination	TD ≥ LRAIC	TD = ATC	TD = Price for last-mile handling of comparable domestic items
Distortion of competition for first-mile activities	N&S		S	S
Distortion of competition for last-mile activities		N	S	S
Distortion of demand from national to foreign origin				N&S
Distortion of demand from target to transition origin	N&S		S	S
Distortion of demand from parcels to packets		N		N&S
Transfer between DOs		N	S	S

Note: N=Necessary condition
S=Sufficient condition

Source: Copenhagen Economics

Whereas the primary objective of a non-distortionary system for terminal dues is eliminating distortions, we also believe that an ideal system for terminal dues should adhere to a number of sound regulatory principles. Examples of such principles are provided by the general objectives specified by postal sector regulatory authorities. Table 19 shows the general objectives regarding tariffs and terminal dues defined by postal regulators in the United States and in Europe.

Table 19 General objectives for postal tariffs and terminal dues

United States (39 US Code Section 3622)	Europe (Directive 2008/6/EC)
Maximize incentives for delivery operators to reduce costs and increase efficiency	Incentivize efficient universal service provision
Create predictability and stability in rates	Transparent USO tariffs and terminal dues
Maintain high quality service standards	Provide for high-quality service provision
Allow the delivery operators pricing flexibility	-
Ensure adequate revenues to maintain financial stability	-
Reduce administrative burden and increase transparency of ratemaking process	-
Establish and maintain a just and reasonable schedule for rates and classifications	Affordability of USO tariffs
Allocate the total institutional costs of the Postal Service appropriately between market-dominant and competitive products	-
-	Non-discriminatory USO tariffs and terminal dues
-	Cost-orientation of USO tariffs and terminal dues

Note: Directive 2008/6/EC only refers to universal service providers

Source: 39 US Code Section 3622: Modern Rate Regulation, Legal Information Institute, 2006; Directive 2008/6/EC of the European Parliament and of the Council. Official Journal of the European Union, European Union website

Benchmarking of the various criteria for non-distortionary terminal dues outlined above against the objectives reveal that terminal dues equal to the price for last-mile handling of domestic letter post items comparable to the mix of inbound letter post items will meet most of the identified objectives (Table 20). In particular, provided that domestic delivery prices meet the objectives identified by postal regulatory authorities, terminal dues will meet the objectives as well.

Table 20 Fulfilment of objectives defined in postal regulation

Regulatory objectives	Non-discrimination	TD ≥ LRAIC	TD = ATC	TD = Price for last-mile handling of comparable domestic items
Efficiency incentives	-	✓	-	✓*
Stable rates	-	-	(✓)	✓*
Pricing flexibility	✓	✓	-	✓*
Transparency	-	-	-	✓*
Financial stability	✓	✓	✓**	✓*
High quality service provision	-	-	-	-
Just and reasonable/affordable rates	-	-	(✓)	✓*
Appropriate allocation of institutional costs	n/a	n/a	n/a	n/a
Non-discrimination between DOs	✓	-	✓	✓
Cost-oriented prices/terminal dues	-	-	✓	✓*

Note: *The fulfilment of the objective only is valid as far as the domestic prices for last-mile activities fulfil the objective in question. **Depends on the level of current prices.

Source: Copenhagen Economics

In the following, we discuss each of the objectives in more detail.

First, both U.S. and EU postal regulation state that postal tariffs must provide efficiency incentives. Terminal dues equal to the price for last-mile handling of domestic letter post

items would meet this second criterion as long as the domestic rates are above the long-run average incremental cost of last-mile activities. This objective would also be met by a direct requirement of terminal dues above the long-run average incremental cost of last-mile activities.

Second, rates should be stable, but the operator should be afforded pricing flexibility. As far as domestic prices for the relevant letter post products meet these criteria, terminal dues equal to domestic prices would meet these criteria as well. Pricing flexibility would also be ensured by a non-discrimination rule, and by terminal dues above the long-run average incremental cost of last-mile activities.

A terminal dues system where the sole requirement is to set rates above the long-run average incremental cost is similar to a system based on competition law alone where prices set by a firm with a dominant market position are considered unlawfully low (predatory) if they are set below a certain cost benchmark (for multi-product firms with a high share of joint and common costs, the relevant cost benchmark is normally the average avoidable costs or the long-run average incremental costs).[79] Provided efficient and swift enforcement of competition law, this system would prevent anti-competitive discrimination and ensure that "as efficient" competitors can compete. Efficient and swift enforcement of competition law may, however, be difficult. This may especially be the case for competition authorities with limited resources and in cases where other sectors receive priority.

Third, prices should be transparent[80]. As long as domestic last-mile tariffs are considered transparent by the national regulator, this would also apply to terminal dues equal to the price for last-mile handling of domestic letter post items.

Fourth, the pricing should lead to financial stability. Terminal dues equal to the price for last-mile handling of comparable domestic letter post items would be conducive to achieving this goal, if domestic rates are not regulated at a level below cost. The objective would also be met by terminal dues equal to the average total cost of last-mile activities, terminal dues above the long-run average incremental cost, and terminal dues subject to a non-discrimination rule only.

Fifth, the rates should promote high quality provision of services. None of the alternatives above meets this objective directly. To provide postal operators with an incentive to maintain high quality of service, which may be costly, a solution could be to include a quality incentive. A quality incentive could imply that terminal dues are reduced up to a certain percentage in case the last-mile operator does not achieve a pre-defined target quality of service. This is very similar to the quality of service incentives that apply to target country operators under the current UPU system.

---

79 See for example International Competition Network (2008), Report on Predatory Pricing, p. 9-11, 36-37

80 What constitutes transparent rates differs across countries. In a study about the pricing behaviour of postal operators in Europe from 2012, it was revealed that only 12 out of 31 national postal regulators had defined criteria for transparency of postal tariffs. Nevertheless, it was also found that regulators without a definition of transparency still undertake measures to ensure transparency. The most commonly used measures were requirements regarding the publication of public price lists (20 regulators) and publication of pricing principles (4 regulators). Source: Copenhagen Economics (2012), Pricing behaviour of postal operators, p. 206

Finally, the rates should be just and reasonable. The ability of the different alternatives to achieve this goal depends on the pass-on to consumers (e.g., whether a requirement to set terminal dues above the long-run average incremental cost translates into end-user tariffs close to this cost, or if the operator puts a high-mark up on the cost).

In addition to the requirements discussed in relation to US policy above, the EU postal directive contains two additional objectives.

First, the EU postal directive states that tariffs for universal services and terminal dues should be non-discriminatory (i.e., applied equally to all buyers). However, regarding terminal dues, the directive only mentions non-discrimination among designated operators. In order to eliminate distortions of competition, however, non-discrimination is required not only among designated operators, but also towards third-party non-designated operators. With respect to the alternative solutions, non-discrimination could be achieved by (i) a direct non-discrimination obligation requiring designated operators to apply the same terminal dues to all operators using the last-mile service, (ii) terminal dues equal to the average total cost of last-mile activities, or (iii) terminal dues equal to the price for comparable domestic last-mile activities.

Second, the EU postal directive states that tariffs for universal services and terminal dues should be 'cost-oriented'[81]. A terminal dues system with rates equal to the cost for last-mile activities might minimize distortion of competition on last-mile handling of cross-border letter post items (as-efficient competitors able to compete with designated operator). It would (in combination with a non-discrimination requirement) eliminate distortions in first-mile handling of cross-border items. Last, but not least, it could also reduce the risk of excessive prices and might also reduce transfers between postal operators.

The only alternative that directly will ensure cost-orientation is terminal dues equal to the average total cost of last-mile activities. However, cost-orientation of terminal dues could also be ensured by rates equal to the price for domestic last-mile activities, provided that the relevant domestic rates are cost-oriented. As long as the prices for last-mile handling of domestic letter post items are not cost-oriented, cost-oriented terminal dues would still create distortions (Box 9).

[81] The EU Third Postal Directive (Directive 2008/6 EC) does not provide a definition of 'cost orientation'. There is also no case law in Europe defining at what level cost-orientation should be measured in the postal sector. In the electronic communications sector, the European Commission has decided that "cost orientation of tariffs means as a general rule that prices are adjusted such that revenues are balanced with costs", cf. Commission Decisions 97/114/EC, 97/310/EC, 97/603/EC and 97/607/EC.

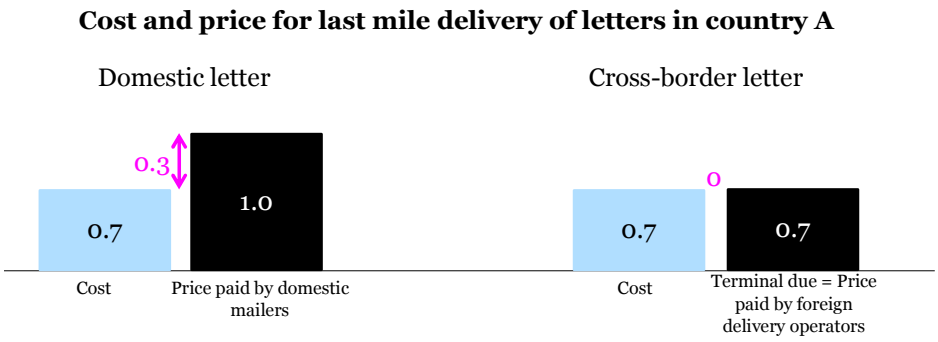
Box 9 Cost-oriented terminal dues may not eliminate distortions

In the example below, the cost for last-mile handling of domestic and cross-border letter post items is 0.7. The mark-up on this cost is 0.3 for domestic letter post items, leading to a price for last-mile handling of domestic mail of 1.0.

If terminal dues are set equal to the cost in this case (i.e., a zero mark-up on costs) this would imply that senders (all else being equal) would have a preference for cross-border delivery compared to domestic delivery.

This might result in a distortion of global mail and trade flows where e-shoppers buy too much cross-border and where large mailers inject mail for the domestic market in foreign countries instead of delivering it domestically end-to-end.

Cost and price for last-mile handling of letters in country A



Source: Copenhagen Economics

In addition to the remaining distortion of international mail and trade flows, cost-orientation of terminal dues poses other challenges. The most prominent one is the difficulty to ensure cost orientation in practice. The reason for this is the lack of accurate cost data (country-specific) which makes it difficult to determine accurate cost-based terminal dues levels.[82] Moreover, it is also difficult to determine which cost benchmark to use. Setting terminal dues equal to the marginal cost of delivery is not possible due to high joint and common costs. Another option would be to set terminal dues equal to average variable cost or average total cost. This, however, may distort efficient competition. Last, but not least, capping terminal dues by costs would not provide for efficiency incentives.

Based on the assessment above, we conclude that the ideal solution would be a terminal dues system where rates equal the price for last-mile handling of domestic delivery services that are comparable to the mix of inbound letters (in terms of the processing required and the costs incurred).

3.4 Need for a practical solution

Implementation of the ideal solution identified above may not be feasible due to practical and political concerns.

[82] This has for example been acknowledged by Ghosal (1999) - Competition in International Postal Markets, p. 3

Practical concerns include the risk that the ideal solution may be complex and burdensome to administer for designated postal operators and national authorities. The fact that the REIMS system for terminal dues does not seem to be overly complicated to administer implies that a UPU system based on country-specific rates would not be too complicated either. Nevertheless, implementing a system with terminal dues equal to the prices for last-mile handling of comparable domestic letter products may pose some practical challenges. The main challenge in this respect is the selection of the domestic letter products (for each country) that are most similar to the inbound cross-border letter mix in terms of processing and associated costs.

First, inbound cross-border letters consist of a mix of letters that are different with respect to the amount and type of processing required in the last-mile phase. Letters collected as single-piece items in the country of origin are normally the most costly items to process, primarily because of their different formats and due to address information that sometimes is incomplete or of poor quality. Moreover, since an increasing share of cross-border volumes is made up of small packets (which incur higher costs in the last mile), finding one domestic product that is comparable to the entire mix of cross-border items will most likely be challenging. In order to reduce this problem, one could introduce a terminal dues system with three different rates - one per letter post format (P, G, and E). This type of framework is already in place in the REIMS system where different terminal dues are applied for P, G, and E items.

In order to define the prices (one per format) for last-mile delivery of cross-border letters, one must first identify the average level of required processing for inbound cross-border items (small letters, large letters, and packets). Based on this, one must identify three domestic letter post products that are most similar (in terms of processing requirements and associated costs) to the cross-border mix of items within each format.

Depending on the availability of information about inbound letter post quality and spectrum of domestic letter post products, this exercise will most likely be easier in some countries than in others. For example, in the United States, First-Class mail has one non-automated pre-sort tariff, meaning that the mail pieces have no barcode, but have some minimal pre-sorting. Eligibility for this tariff also requires the purchase of a permit and a minimum mailing of 500 pieces. If inbound small letters to the U.S. on average gets the same number of sorts that First-Class single-piece mail gets, this could imply that the First-Class non-automated pre-sort tariff should be applied to inbound cross-border small letters to avoid distortions.

Using the single piece letter tariff (or a share thereof) as a benchmark for terminal dues would not be an optimal solution. There are two main reasons for this. First, prices for domestic single piece letter delivery are often subject to price regulation. This implies that the single-piece price in some countries is very low and may not even cover the cost of last-mile activities. Second, in countries where single-piece prices are not regulated at a low level, the single-piece price often reflects an inelastic demand (compared to the demand for bulk mail). As a result, the price of single-piece items may be disproportionately high. We have over the past few years observed price increases for single-piece items (e.g.,

in Canada, the Netherlands and in Finland) in the range of 20 to 40 percent from one year to another. Underlying costs have most likely not changed to the same extent. The single-piece tariff (or even a share thereof) may therefore not be a good indicator of the actual costs incurred.

When the most similar domestic letter products (within each format) have been identified, one needs to document an average price per format. Last, but not least, national authorities would have to ensure that postal operators charge these prices for last-mile handling of cross-border letter post items, and that the same prices are charged to all delivery operators (irrespective of their identity or origin). If the most similar domestic products identified are outside the scope of the universal service obligation, this would make it more challenging for regulatory authorities to ensure compliance with the terminal dues system (as prices are not monitored by the regulator).

Political concerns primarily include the risk of reduced affordability of cross-border letter mail. The ideal solution implies that cross-border delivery may become more expensive for senders (especially in transition countries where operators enjoy lower rates than operators in target countries).

There is to our knowledge no extensive publicly available research on the correlation between terminal dues and prices for international letter mail originating in transition countries. In 2010, the UPU Postal Operations Council published results of market research showing that the outbound terminal dues as share of the international letter tariffs were between 21 and 123 percent for developing countries (on average). The lowest share was found for letters weighing 20 grams whereas the highest share was found for letters weighing 500 grams. For items weighing between 1 and 2 kilograms, the terminal dues' share of the international postage was reported to be between 57 and 74 percent.[83] If senders in transition countries already today pay tariffs significantly above the terminal dues rate (i.e., the domestic postal operator in the transition country earns a high margin on outbound cross-border mail), an increase in terminal dues may only reduce the margin for the postal operator. Based on the research findings referred to above, this seems to be the case for single piece light-weight letters at least (i.e., letter items that normally are subject to postal regulation affordability criteria). In this case, an increase in terminal dues would have no effect on the price paid by individual senders. The same holds true if international letter tariffs today are determined by competition (i.e., competitors' delivery costs) instead of by the level of terminal dues.

If senders pay a price close to the terminal due plus any costs incurred in the first mile[84], or if the postal operator is able to pass on the higher cost to its customers, higher terminal dues may imply a reduced demand for international letter delivery. This is allocatively efficient, but maybe not socially desirable.[85]

---

83 UPU (2010), POC C 1 TDG 2010.1–Doc 3c

84 This is most likely the case for certain types of bulk mail. One example of this is the often observed 'free shipping' offers for e-commerce products up to two kilograms sent from Asia to Europe (cf. chapter 2)

85 As social policy, it would seem that the case for under-pricing mail from developing countries to industrialized countries is limited to social mail only, not business mail and e-commerce packets.

Another political concern may be reduced profitability of postal operators. The ideal solution may imply that postal operators in transition countries experience reduced profitability due to higher prices paid for last-mile delivery of cross-border letter post (caused by higher terminal dues) and lower revenues (caused by declining demand).

In addition to the decline in demand caused by higher terminal dues, designated operators worldwide may also lose mail volumes to alternative operators (who gain in competitiveness due to non-discriminatory treatment).

Both effects may potentially impact the sustainability of the provision of universal services.

A third political concern may relate to the competitiveness of e-retailers in transition countries. If terminal dues paid from transition to target countries increase, it may reduce the attractiveness of e-retailers in transition countries to e-shoppers in industrialised countries.

Last, but not least, the current discussions within the UPU regarding product/service definitions and the possibility of bringing terminal dues and inward land rates together into a common system might be an obstacle as well.

In order to cope with the first two political concerns mentioned above, a practical solution could be to complement the ideal solution with an aid program for developing countries. The practical solution would imply that the ideal solution is implemented for all countries. Alongside this, a compensation scheme could be introduced for transition countries in groups 2, 3, 4, and 5 in order to ensure affordability of cross-border letter mail and sustainability of provision of universal services in developing countries.

The possible design of a compensation scheme could be a foreign aid scheme where funding can be used to (i) ensure affordability of cross-border letters or (ii) ensure sustainable provision of universal services. This is rather similar to the current quality of service fund (applied to the terminal dues payments from target countries) from which transition countries can apply for money in order to fund specific development projects, aimed to improve the quality of delivery of international mail.

The practical solution would imply that incentives throughout the value chain remain undistorted. Nevertheless, in order to ensure that the aid scheme is effective and that the money is used in line with the political intentions, the solution needs to be accompanied by rules. Rules could, for example, determine which postal products that must be affordable (i.e., which mailers that can be subsidised). Such rules would be necessary to prevent inefficient remail and distorted e-commerce.

With this practical solution, a remaining concern would be the reduced competitiveness of e-retailers in transition countries. In order to cope with this issue, a potential solution could be to include other trade facilitating elements in the terminal dues discussion as well. This could for example be questions relating to trade barriers, customs, and VAT.

Chapter 4

Measuring distortions of terminal dues

4.1 Summary of findings

In this chapter we propose an empirical framework for qualifying and quantifying the economic distortions identified in the previous chapters.

To measure distortions created by the current system of terminal dues, one must compare the actual situation with the current set of terminal dues to the counterfactual situation, in which terminal dues are non-distortionary. The difference between the two situations can be identified as a distortion of the ideal state.

We propose a framework when the measurement of distortions is split into two steps. The first step is a qualification or screening step where the likelihood and significance of distortions are determined. The second step is a quantification step where the magnitude of the distortions is estimated. Only if distortions are identified as real and significant in the first step should one proceed to step two.

Approaches to assess the likelihood of distortions occurring are different for the different distortions identified. Whereas distortions of competition for last-mile handling of cross-border letter post items can be assessed by comparing terminal dues to the cost of last-mile activities or through benchmarking with market segments without any distortions created by terminal dues, other distortions require other approaches. For example, to assess the extent of a distortion of global mail and trade flows or distortions of demand for packets versus parcels, it is important to first establish the degree to which terminal dues charged for last-mile activities have an impact on the price paid by end-users. If terminal dues only have little influence on end-user prices for delivery, the distortion of demand will most likely be small as well.

Table 21 presents an overview of methods that can be used for assessing the likelihood and significance of distortions created by terminal dues.

Table 21 Framework for measuring if distortions are real and significant

Distortion	Approach
Distorted competition for last-mile activities	· Investigate if there is a legal or de facto monopoly on last-mile handling of letter post items · Investigate relation between terminal dues and LRAIC for last-mile handling · Benchmark with competitive situation in non-distorted market segments
Distorted competition for first-mile activities	· Investigate difference between terminal dues paid by designated and non-designated operators · Investigate importance of delivery price for choice of delivery operator · Benchmark with competitive situation in non-distorted market segments
Distorted demand for packets and parcels	· Investigate correlation between terminal dues and prices for cross-border packets · Investigate importance of delivery price for choice of delivery service based on cross-price elasticity for packet and parcel delivery
Distorted mail/trade flows between domestic and cross-border origination and between target and transition origin	· Investigate the relation between terminal dues and the price for last-mile handling of comparable domestic letter post items · Investigate correlation between terminal dues and prices for cross-border letter post items · Investigate importance of delivery price for decisions to buy online/inject letters cross-border · Investigate link between terminal dues and demand for cross-border letters post items
Transfers between delivery operators	· Calculate difference between terminal dues and prices for last-mile handling of domestic letter post items

Source: Copenhagen Economics

If terminal dues are found to have an actual impact on demand for delivery services, there are several options for how to assess the magnitude of the distortion on question. Simple comparisons of cross-border mail and trade flows and more advanced gravity models and difference-in-differences analysis can be used to estimate the impact of distortions on global mail and trade flows in terms of mail volumes and associated revenues.

In order to measure the effects of distortions on the wider economy (in terms of effects on social welfare, prices of services, import and exports, output, employment, and GDP) a more comprehensive approach is needed. A good tool for this could be a computable general equilibrium (CGE) model.

The CGE modelling approach estimates the impact of barriers to trade on total economic welfare. It builds on recent economic literature, which suggests that close availability of a diverse set of products and services is important to economic growth. In the context of terminal dues, distortion of competition for first-mile and/or last-mile activities caused by terminal dues could be included in the model as an increase in the cost of service production. Similarly, the distortion of global mail and trade flows (caused by discriminatory and sometimes too low terminal dues) could be included in the model as a non-tariff barrier equivalent to the terminal dues. In this way, the CGE model might be able to estimate the impact of a change in terminal dues on total economic welfare.

4.2 General framework for measuring distortions

As identified in chapter 3, the current UPU terminal dues system engenders potential distortions primarily as a consequence of the following three characteristics:

- Terminal dues may be lower than the long-run average incremental cost for last-mile activities
- Terminal dues may be lower than the price for last-mile handling of comparable domestic letter post products
- Terminal dues are discriminatory (across member operators and towards third-party operators)

Whenever one of the above characteristics is present, there is potential for distortions. Table 22 presents an overview of the potential distortions identified in previous chapters.

Table 22 Distortions – overview

Distortion	Main source of distortion
Distorted competition for last-mile activities	Terminal dues < last-mile LRAIC
Distorted competition for first-mile activities	Terminal dues not available to third-party operators (discrim-ination)
Distorted demand for packets and parcels	Terminal dues < price for last-mile handling of domestic letter post items
Distorted mail/trade flows between domestic and cross-border origination	Terminal dues < price for last-mile handling of domestic letter post items
Distorted mail/trade flows between target and transition origination	Discriminatory terminal dues between target and transition countries
Transfers between delivery operators	Terminal dues < price for last-mile handling of domestic letter post items

Note: LRAIC=long-run average incremental cost

Source: Copenhagen Economics

The first question that arises is whether the distortions above appear in reality. If they do, the second question that arises is how large they are. The third question that arises is how much the distortions matter for total social welfare, i.e., the economy-wide effects.

A general framework for assessing whether the distortions identified in previous chapters are real and significant should contain the following three questions:

1. What would the non-distortive terminal dues rate be?
2. How would delivery operators, senders, and recipients react to the new set of terminal dues?
3. Which volumes are potentially affected by the distortions?

Answering these questions would offer insight into:

1. The size of the gap between distorted and non-distorted terminal dues rates
2. Whether the distortion is likely to occur in reality
3. The significance of identified distortions

If terminal dues are found to have an actual impact on demand for delivery services, one could continue with attempts to quantify the magnitude of the distortions in terms of (i)

their impact on trade and mail flows and (ii) their impact on social welfare, prices of services, import and exports, output, employment, and GDP.

In the following sections we discuss how each of the identified distortions can be qualified and quantified within this framework. We also outline the relevant data that would be necessary to conduct the assessments.

4.3 Estimating the likelihood and significance of potential distortions

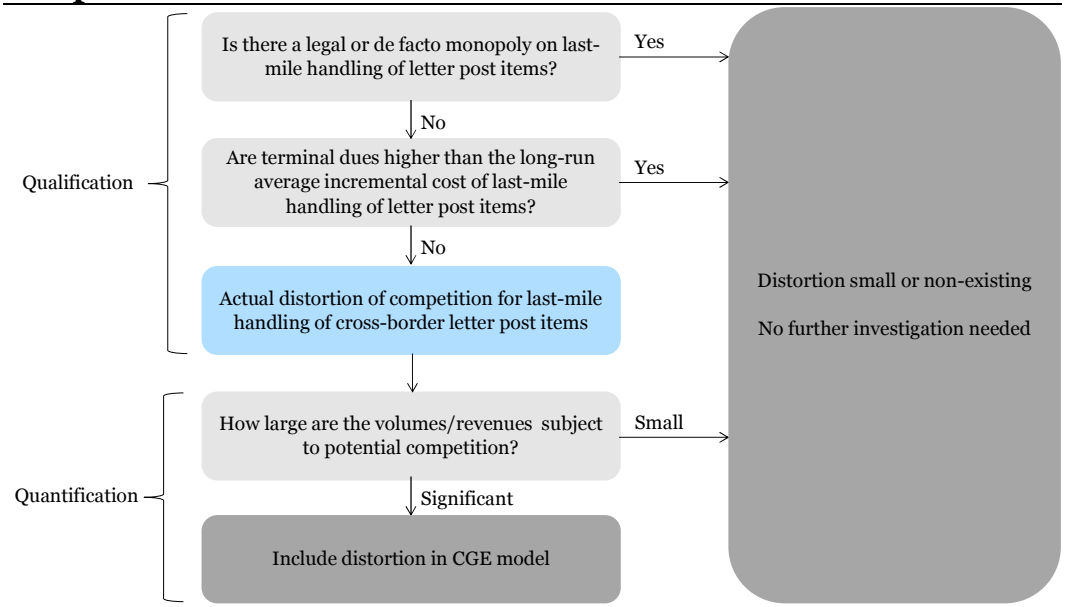
Distortion of competition for last-mile activities

When the market for domestic (last-mile) delivery is liberalized, non-designated operators may compete for delivery of last-mile cross-border mail volumes. However, if terminal dues are below the long-run average incremental cost of last-mile activities, this will prevent operators as efficient as the designated operator from competing in this market.[86] Thus, non-distortive terminal dues will need to be at least at level with the long-run average incremental cost for last-mile handling of cross-border letter post items. In a country with competition in domestic last-mile activities, the competitive price for last-mile handling of cross-border items is probably close to the price for last-mile handling of comparable domestic items (possibly adjusted for higher costs related to the handling of cross-border items).

Figure 18 presents a framework for measuring distortions of competition for last-mile activities created by the current level of terminal dues.

[86] According to EU competition law, it is unlawful for a dominant operator to price below the long-run average incremental cost. Failure to cover the long-run average incremental costs indicates that the dominant firm is not recovering all the (attributable) fixed costs of providing the service in question and that an equally efficient competitor could be foreclosed from the market. See for example European Commission (2009), p. 5.

Figure 18 Framework for measuring distortions of last-mile competition



Source: Copenhagen Economics

Is there is a legal or de facto monopoly on last-mile handling of letter post items?
As last-mile competition can only be distorted insofar as competition is possible, the first step is thus to investigate whether competition is possible or not. If competition is prevented by law, or if competition is impossible due to factors such as high barriers to entry, then there will most likely be no distortion created by terminal dues, because even with non-distortive terminal dues, there would be no competition in the market.

Are terminal dues below the long-run average incremental cost for last-mile activities?
If terminal dues are below the cost of last mile delivery, this means that an operator as-efficient as the designated postal operator will not be able to compete. Although there is no firm consensus about what the relevant cost benchmark should be, recent case law[87] and the guidelines from the European Commission[88] suggest that the relevant cost benchmark should probably be the long-run average incremental cost. There are two main approaches to estimating the long-run average incremental costs of last-mile activities. The first approach is referred to as a top-down approach. In the top-down approach, accounting data is used to determine the costs associated with last-mile activities. The second approach is referred to as a bottom-up approach. The bottom-up approach is based on a value chain analysis where activities in the value chain are identified and costs associated with each activity are estimated. The main characteristics of the top-down and the bottom-up approach for estimating long-run average incremental costs are shown in Table 23.

87 C-209/10, Post Danmark
88 European Commission (2009), Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings

Table 23 LRAIC for last-mile delivery: top-down vs. bottom-up

Top-down approach	Bottom-up approach
Based on accounting data	Based on value chain
Distribution of aggregated costs	Measurement of cost incurred by specific activities
Complex calculations	Intuitive and simple calculations
Extensive data needs	No extensive data needs

Source: Copenhagen Economics

When estimating incremental costs in the postal sector, the main challenge is the large share of joint and common costs in mail delivery. The fact that the same machines and the same postal workers are used to process and deliver many different types of mail items implies that the cost of delivering one extra item is often very low. Top-down cost estimates are derived from aggregated financial data using the fully distributed costing method. This implies that incremental costs not always can be derived directly from accounting data. Moreover, it can be difficult for authorities to assess the reliability of cost estimates based on accounting data.

The bottom-up approach has proven to be a practical, intuitive, and effective way of coping with the challenges linked to accounting data and estimating incremental delivery costs in the postal sector. Under this approach, costs are calculated based on measures for elementary activities (e.g., number of visits to letter boxes) multiplied by unit costs for the different resources (e.g., cost per visit per letterbox). The costs of elementary activities are aggregated to establish the costs for the relevant service (e.g., last-mile handling of cross-border letters).

Box 10 describes how costs can be estimated in practice based on the bottom-up approach.

Box 10 Bottom-up approach to cost assessment

The bottom-up approach to incremental cost assessment uses the postal value chain as its point of departure. The bottom-up approach therefore requires a good understanding of the activities taking place in relation to mail delivery. The approach consists of three steps:

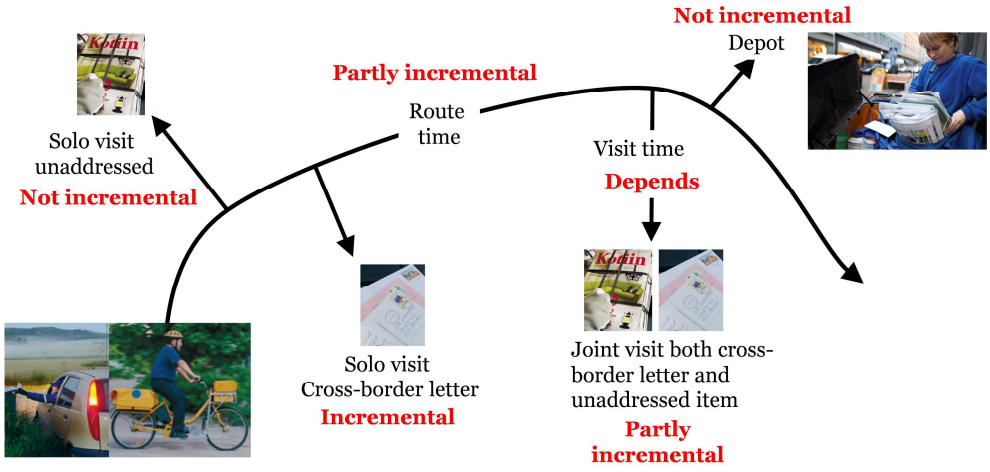
1. Describing the relevant activities in the value chain
2. Describing how activities would be different if a product was removed
3. Quantifying changes and estimate costs

With respect to last-mile handling of cross-border letter post items, the relevant activities in the value chain could be: handling of items when received from first-mile operator, transport to sorting centre, sorting, transport to delivery office, handling of items at delivery office, delivery to recipients, handling of undeliverable items, and general administration.

If cross-border items would be removed from the activities identified above, this would result in (amongst other things): fewer items being handled, less time being spent on sorting and delivery, less time being spent on handling registered letters and undeliverable items.

The illustration below shows the final delivery phase and the activities that are fully, partly, or not incremental to the delivery of cross-border letters. A similar exercise to identify the costs incremental to the handling of cross-border letters should be conducted for the other last-mile activities as well, such as transport, sorting and general administration.

Incremental costs in the final delivery phase



To quantify these changes and estimate incremental costs, one often needs to combine several sources of information. Sources of information could include postal operators' annual reports, statistics on the number of cross-border letters of different formats and weights, statistics on the share of cross-border items sent as registered letters, and time studies estimating the time spent on different activities in the production process.

Source: Copenhagen Economics

The bottom-up approach allows authorities to cross-check the top-down data provided by the postal operator. The European group of postal regulators (ERGP) has recognized the

usefulness of the bottom-up approach for this purpose,[89] and the national competition authorities in Denmark and Germany have applied price cost tests based on bottom-up cost calculations.[90] Using the bottom-up approach in the context of terminal dues could allow for determining if terminal dues are above the long-run average incremental cost for last-mile activities, in order to tell whether an as-efficient non-designated competitor can compete.

Table 24 below presents the data requirements for conducting the assessments described above.

Table 24 Data for identifying distortions of last-mile activities

Assessment	Data requirement	Data source
Calculation of LRAIC	Internal accounts of designated postal operator (to calculate LRAIC in last-mile activities)	National postal operator
	Information about costs incurred and volumes handled in different steps of the postal value chain	National postal operator

Source: Copenhagen Economics

How large are the volumes subject to potential competition?
The estimate of volumes potentially affected by the distortion will indicate the significance of the distortion (e.g., the share of the total postal market subject to the distortion). Inbound cross-border items normally subject to competition are bulk letters and packets. These items normally correspond to no more than two percent of total (i.e., domestic and international) volumes delivered (cf. chapter 1). Nevertheless, there may be firms that can make a business case for last-mile delivery of cross-border items, for example in larger cities.

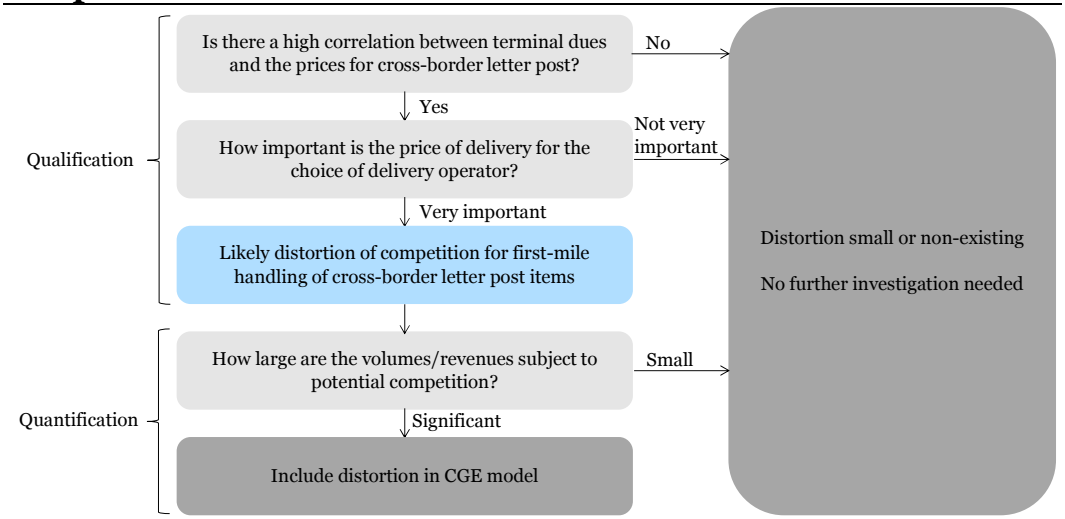
If the distortion is considered significant enough, one should proceed with an attempt to quantify the wider effects on total social welfare. This could be done based on a computable general equilibrium (CGE) model which is able to capture the total effects of all significant distortions. The CGE model and its application to the context of terminal dues are described in section 4.4.

Distortion of competition for first-mile activities
The fact that third-party operators do not have access to the terms and conditions of the UPU terminal dues system may distort competition between designated and non-designated operators in the market for first-mile handling of cross-border letter post.

Figure 19 presents a framework for measuring the distortions of first-mile competition.

89 ERGP (2011)
90 Copenhagen Economics (2012), p. 268

Figure 19 Framework for measuring distortions of first-mile competition



Source: Copenhagen Economics

Is there a large difference between terminal dues paid by designated and non-designated operators?
Terminal dues will only distort competition for first-mile activities insofar as designated and non-designated operators are charged different rates for the same service (i.e., last-mile handling of cross-border letter post items). In order to measure the effects of terminal dues, it is therefore crucial to examine whether the terminal dues charged to designated and non-designated operators are significantly different. There is no general rule for what constitutes a significant difference in terminal dues. However, a difference of less than five percent is not likely to have a large impact on the competitiveness of non-designated first-mile operators.[91]

This information can only be provided by the designated postal operators themselves, for example in interviews or in response to a questionnaire from the national regulator.

If there is a large difference between the terminal dues paid by designated and non-designated operators for the same service, this could indicate a distortion.

How important is the price of delivery for the choice of delivery operator?
The extent to which distorted prices affect decisions depends on how important prices are for the decisions made. If prices only play a minor role when senders and recipients decide which operator to use, then distorted prices will most likely not distort decisions. However, if the price is an important factor when choosing among delivery operators, then competition is likely to be distorted. The importance of prices for the choice of delivery operator can be examined via interviews with large mailers or online surveys among e-shoppers.

[91] Competition authorities generally use 5 to 10 percent as a threshold for significant price increases , e.g., in relation to the SSNIP test used to define relevant markets.

How large are the volumes subject to potential competition?
By estimating the volumes potentially affected by the distortion, one would get an indication of its potential magnitude. For first-mile activities, volumes normally subject to potential competition are outbound cross-border bulk letters. One could also imagine that first-mile handling of single-piece packets could be attractive for non-designated operators who already deliver single-piece parcels and have a network in place for collection of single-piece items.

The level of competition (amount of work-sharing) in first-mile handling of domestic letters provides an indication of the volumes subject to potential competition. For example, if 50 percent of domestic mail is handled by non-designated operators, while zero percent of cross-border mail is handled by non-designated operators, this could indicate that there is potential for competitors' market share for cross-border deliveries to be as high as 50 percent.

Interviews with non-designated operators, regional carriers, and large mailers that engage in first-mile activities for domestic letter post items could also provide useful information about the volumes subject to potential competition. Interviews could for example provide useful information on why these operators do not participate in the market for cross-border delivery (due to terminal dues or other reasons). Interviews with non-designated operators in relation to this study have indicated that terminal dues are an actual impediment to competition for first-mile handling of cross-border letter post.

The data necessary for qualifying the distortions of competition for first-mile activities are summarized in Table 25 below.

Table 25 Data for measuring distortions in first-mile activities

Assessment	Data requirement	Data source
Correlation between terminal dues and end-user tariffs	Terminal due rates for different destinations (for several countries)	National postal operators, UPU
	Price data for cross-border letters (per destination, for several countries)	National postal operators
Importance of letter prices for demand	Share of mailers finding postal tariffs important for their choice of delivery operator	Interviews, consumer surveys
Volumes affected by the distortion	Share of domestic and cross-border mail letters handled by non-designated operators in the first-mile	National postal operator, National regulatory authority

Source: Copenhagen Economics

If, based on the screening exercises described above, the distortion of first-mile competition would be considered significant one could proceed with an attempt to quantify its wider effects on total social welfare. This could be done based on a computable general equilibrium (CGE) model which is able to capture the total effects of all significant distortions, cf. section 4.4.

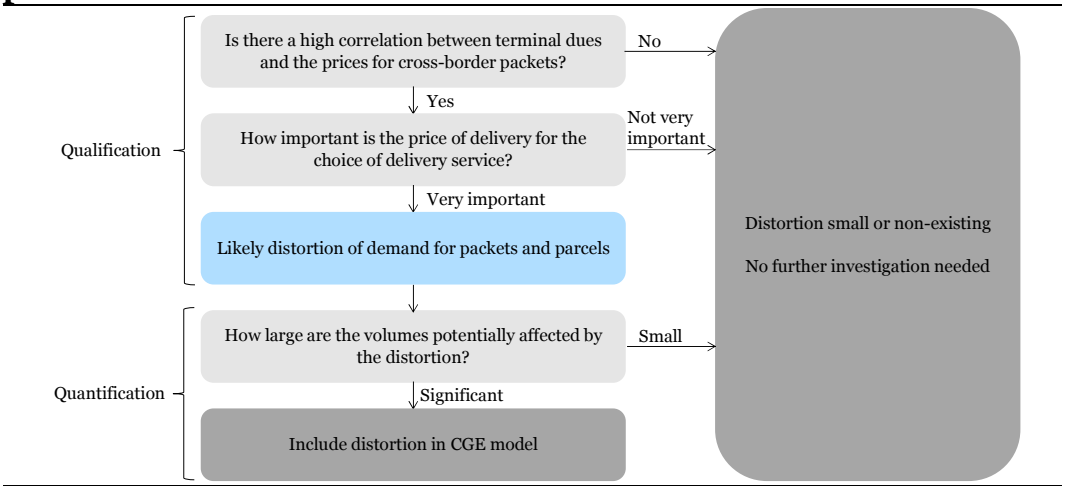
Distortion of demand for packets and parcels

For delivery of items below two kilograms, packet delivery and parcel delivery are often substitutes. Substitution of packets for parcels can often be observed in e-commerce, where a large share of products bought weighs less than two kilograms. If the two services are considered (to some extent) substitutable by end-users, the price for cross-border packet delivery will have an impact on the demand for cross-border parcel delivery, and vice versa. In this situation, lowering the price on packet delivery as a response to a low terminal due may make it difficult for parcel delivery operators to compete with the designated operator, due to reduced demand for parcel delivery.

The distortion of demand for packets and parcels is minimized if the terminal dues equal the price for last-mile handling of domestic packets (such that the price difference between packet and parcel delivery corresponds to the cost difference between the two services).

Figure 20 presents the framework for measuring distortions of demand for packets and parcels. This framework is very similar to the framework for measuring distortions of competition in first-mile handling of letter post items (described in the previous section).

Figure 20 Framework for measuring distortions of demand for packets



Source: Copenhagen Economics

Is there a high correlation between terminal dues and prices for cross-border packets?

As previously mentioned, terminal dues will only distort demand for packets and parcels insofar as they spill over to the price for end-to-end delivery offered by the designated operator.

A way to investigate the spill-over of terminal dues on end-to-end tariffs is to assess the correlation between terminal dues and the end-to-end prices charged for cross-border packet delivery. A low correlation (based on a cross-country sample) means that variations in terminal dues do not explain variations in end-to-end prices. A low correlation

would thus signal that prices for cross-border packet delivery are not distorted as a result of terminal dues and that there is no significant distortion of demand between packet and parcel delivery.

How important is the price of delivery for the choice of delivery service?
In the case of demand for packets and parcels, the importance of prices for the choice of delivery service can be examined by calculating the cross-price elasticity for packet and parcel delivery. High cross-price elasticity between the two delivery services indicates a competitive pressure between the products and thereby a potentially large distortion of demand.

Interviews with providers of cross-border parcel delivery could also provide useful information about the importance of prices. A key question to ask is whether parcel operators experience a fierce competitive pressure from low packet prices. If the answer is yes, the operator can be asked to provide additional documentation supporting this statement. If parcel delivery providers do not consider low packet prices offered by designated operators a problem, there is most likely no significant distortion of demand for packets and parcels.

How large are the volumes potentially affected by the distortion?
The distortion of demand between packet and parcel delivery will affect cross-border items below two kilograms, for which parcel and packet delivery are substitutes. Moreover, the distortion could be expected to have a larger impact on delivery of items of low value, for which track-and-trace is less important. In some countries, designated operators also offer tracking for cross-border registered letters. In these cases, packet delivery could be a relevant substitute to parcel delivery for a larger share of items.

The data necessary for measuring the distortions are summarized in Table 26.

Table 26 Data for measuring distortions of demand for packets vs. parcels

Assessment	Data requirement	Data source
Correlation between terminal dues and end-user tariffs	Packet terminal due rates for different destinations (for several countries)	National postal operators, UPU
	Price data for cross-border packets (per destination, for several countries)	National postal operators
Importance of letter prices for demand	Share of mailers finding postal tariffs important for their choice of delivery operator	Existing studies on cross-border e-commerce, interviews with e-retailers and their associations
	Cross-price elasticity for packets and parcels	Conjoint analysis*, natural experiments, consumer surveys etc.
Volumes affected by the distortion	Volumes and revenues of designated and non-designated operator for first-mile handling of cross-border items below and above two kg	National regulatory authorities; interviews with operators

Note: Conjoint analysis can be used to reveal users´ valuation of different product attributes. By requiring the research participants to make a series of trade-offs, conjoint analysis can be used to reveal the willingness to pay for delivery features such as fast delivery, track and trace, and signature at delivery.

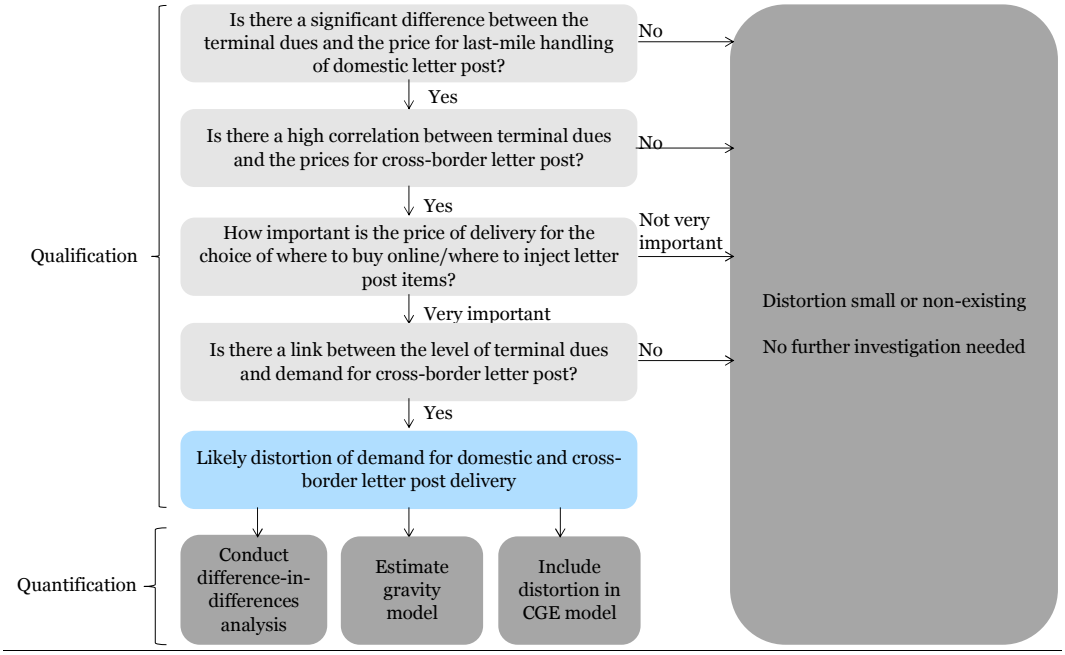
Source: Copenhagen Economics

Distortion of global mail and trade flows

Distortions of global mail and trade flows are caused by two elements in the terminal dues system. First, terminal dues lower than the prices for last-mile handling of domestic letter post items may provide foreign e-retailers with a competitive advantage and incentivize location of warehouses and injection of bulk mail abroad (ABA remail). Second, discrimination between target and transition countries may incentivize mailers to inject cross-border letters in transition countries instead of in target countries (ABC remail). Discriminatory treatment of transition countries may provide e-retailers in transitions countries with a competitive advantage.

Figure 21presents the framework for identifying if distortions of global mail and trade flows are real and significant.

Figure 21 Framework for measuring distortions of global mail and trade flows



Source: Copenhagen Economics

How large is the difference between the terminal dues and the price for last-mile handling of domestic letters post?

The magnitude of the distortions created by terminal dues will be linked to the difference between the terminal dues charged today and the optimal situation. If terminal dues already today are close to the price for last-mile handling of comparable domestic letter post items, the distortion is most likely small or non-existing. In this case, it might not be necessary to continue with a quantitative assessment of the distortions.

Is there a high correlation between terminal dues and the prices for cross-border letter post?

To investigate whether terminal dues are likely to influence mailers' decisions of where to inject letter post items and e-shoppers' decisions of where to buy online, one could assess the cross-country correlation between terminal dues paid (per country) and the end-to-end prices charged for cross-border delivery to that country. A low correlation would signal that cross-border delivery prices are not distorted as a result of terminal dues and that there is no significant distortion of demand.

How important is the price of delivery for the choice of where to inject letter post items/where to shop online?
If senders and recipients do not consider price of delivery (or landed cost) a decisive factor when shopping online or when deciding in which country to inject letters, this indicates that decisions are not affected by distorted prices.

Interviews with large mailers and surveys among e-shoppers could provide helpful insights into this question.

A further approach to investigate the importance of delivery prices is to conduct business case simulations. In this way, one could assess qualitatively if the decisions made by large mailers, e-retailers, and e-shoppers are likely to be distorted before embarking on any attempts to quantify the potential distortion.

Two relevant business cases to investigate are (i) bulk mailers' business case for injecting letters cross-border instead of domestically and (ii) e-shoppers' business case for buying online cross-border instead of domestically. Similar business cases can be established for the decisions to inject letters or shop online from a transition country instead of a target country.

For the case of bulk mailers' incentive to inject letters in a certain country, it would be relevant to focus on large mailers such as banks, utility companies, and insurance companies. Based on yearly letter volumes, prices for domestic delivery, and prices for cross-border delivery (including additional cost for printing or transporting letters cross-border), one could calculate the cost for (i) domestic delivery and (ii) cross-border delivery (ABA remail). One could then calculate the potential savings from cross-border delivery as a share of the total mailing cost. If the savings potential is small, the incentives for injecting mail cross-border will likewise be small. In this case, there is most likely no gain in conducting advanced calculations of quantitative effects. On the other hand, if the savings potential is significant, this would call for an in-depth assessment of quantitative effects.

The same kind of business case simulation can be conducted for the case of cross-border versus domestic e-commerce. In this case, one could investigate the potential savings as a share of the landed cost (product price plus shipping) that e-shoppers in different countries could obtain by ordering online cross-border instead of domestically.

Is there a link between the level of terminal dues and demand for cross-border letter post?

If terminal dues create distortions in global mail flows, then we would expect mailers to react to changes in terminal dues by changing their demand for cross-border delivery of letter post items.

The link between terminal dues and the demand for cross-border mail could be investigated through case studies. A useful case study could be, for example, a postal operator who has negotiated a new terminal dues agreement with a significant change in terminal dues rates. Another useful case study could be a postal operator who has changed status from transition to target in the UPU system and thereby has incurred an increase in terminal dues rates.

If there is a high correlation between changes in terminal dues and changes in letter post volumes, this could indicate that the level of terminal dues has an actual impact on mail flows and that it might be worth undertaking more advanced quantification exercises.

Another way of assessing if there is a link between terminal dues and the demand for cross-border mail could be to compare bilateral letter post flows with bilateral trade flows.[92] This approach relies on the assumption that global letter post flows should follow the same patterns as global trade flows (i.e., letter post and trade flows are determined by essentially the same macroeconomic and microeconomic drivers – with the exception for terminal dues). This is a very strong assumption which most likely is not completely applicable. For example, with respect to e-commerce deliveries, there is a risk that part of the distortion may be disguised if low terminal dues also increase the trade flow from transition countries (e.g., increased cross-border e-commerce). Nevertheless, this simplified approach may still be useful to detect any disproportionately high bilateral letter post flows caused by low terminal dues.

The data necessary for the first screening or qualification of distortions are summarized in Table 27.

[92] The comparison should be done in percentage terms (e.g., if ten percent of global trade flows are between countries A and B, the ten percent of global mail flows ought to be between countries A and B also.

Table 27 Data for qualification of distortions of global mail and trade flows

Assessment	Data requirement	Data source
Comparison between terminal dues and price for domestic last-mile activities	Terminal dues	UPU, national postal operator
Correlation between terminal dues and end-user tariffs	Terminal dues for different destinations (for several countries)	National postal operators, UPU
	Price data for cross-border letter post (per destination, for several countries)	National postal operators
Importance of letter prices for demand	Importance of price for choice of where to inject letter post items/where to shop online	Existing studies on cross-border e-commerce, interviews with e-retailers and their associations, interviews with large mailers
	Price for last-mile handling of domestic letter post items	National postal operator
	Price for domestic delivery	Large mailers (banks, utility companies, insurance companies)
	Price for cross-border delivery	Large mailers (banks, utility companies, insurance companies)
Link between terminal dues and letter volumes	Development in terminal dues (cross-country)	UPU
	Development in cross-border letter post volumes (cross-country)	UPU; national regulatory authorities; national postal operators
	Bilateral cross-border letter post flows	UPU
	Bilateral cross-border trade flows	OECD

Source: Copenhagen Economics

If the screening exercises above have shown a likely and significant distortion of global mail and trade flows created by terminal dues, two approaches can be adopted in order to *quantify* the impact on mail and trade volumes:

- Difference in differences estimation
- Gravity model estimation

In addition to this, CGE modelling can be applied to estimate the impact of distortions on total economic welfare, cf. section 4.4.

Difference in differences estimation

A difference-in-differences estimation is an empirical method used to estimate the isolated effect of some policy change. The idea behind this methodology is to compare the performance of an entity affected by the policy change (treatment group) before-and-after the policy goes into effect, with the equivalent change in performance of an entity not affected by the policy change (control group). In this case, the relevant entities are designated postal operators and the policy change is a change in terminal due rates.

The distortion of mail and trade flows can be measured by comparing the development in mail flows of two more relevant delivery products where one or several of the products are affected by changes in terminal dues. These changes could for example be triggered by a change of UPU status from transition to target country or the negotiation of a new (bilateral) terminal dues agreement with higher or lower terminal dues rates. The estimation

will seek to answer the question whether volume developments look different for the flow(s) subject to the change in terminal dues.

The methodology for conducting a difference-in-differences analysis for cross-border letter mail is described in Box 11.

Box 11 Difference-in-differences analysis for cross-border mail

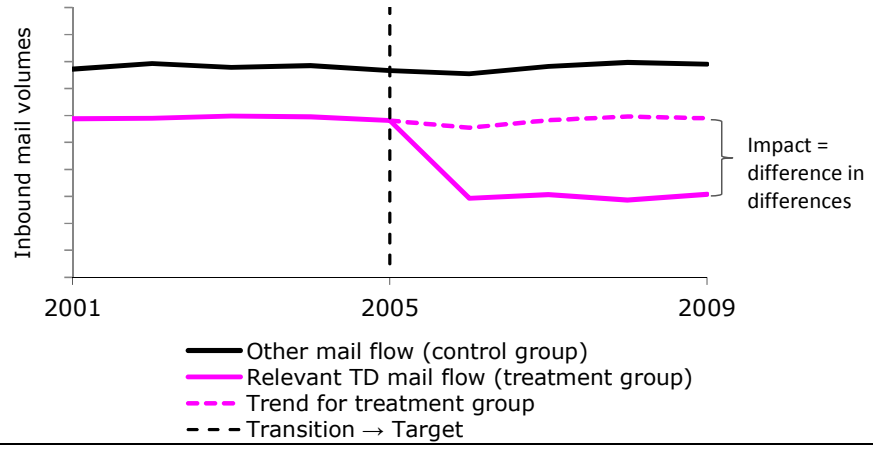
A difference-in-differences analysis for cross-border mail flows uses data on two sufficiently comparable inbound mail flows where one flow is subject to terminal dues and the other is not. This data could, for example, be bilateral flows of cross-border e-commerce packets (subject to terminal dues) and bilateral flows of cross-border e-commerce parcels above two kilograms (not subject to terminal dues).

Time series data for the flows are collected for one or several countries where terminal dues have changed at some point in time, for example due to a change of UPU status from transition to target country or the negotiation of a new (bilateral) terminal dues agreement with higher or lower terminal dues rates. In order to ensure robustness of the analysis, it is important that the data covers a sufficiently long period of time before and after the structural change.

The illustration below shows a hypothetical example of how a policy change (here in 2005) creates a change in the relevant mail flow. The change is benchmarked against changes in other mail flows (or variables) that are highly correlated with the mail flow subject to terminal dues.

In the illustrative example below, we observe that mail volumes decline when the country changes status from transition to target and terminal dues increase. The negative correlation between terminal dues and letter volumes could be used to estimate how demand for delivery of cross-border letter post items would react to changes in the level of terminal dues.

Difference-in-differences: Illustrative results



Source: Copenhagen Economics

The main benefits of a difference-in-differences analysis are the low requirement regarding the number of model assumptions and its simple, testable methodology. The low requirement regarding the number of model assumptions is because only data on relevant

mail flows and changes in terminal dues is required, and estimations can be performed using data for only a few countries.

The main drawbacks of a difference-in-differences analysis are its limited applicability, partial focus, and low generality. The limited applicability is due to the requirement of a policy change for meaningful estimation, and the requirement that benchmark products (control group) must follow the same trends and be exposed to the same external shocks as the treatment group, such as an increase in e-commerce. The partial focus is because the difference-in-differences analysis only considers part of the total distortion—specifically, volume gains by transition countries under the current system. The low generality is due to the fact that difference-in-differences analysis does not consider country-specific factors that may magnify effects, such as the propensity of e-commerce to move to certain transition countries.

Gravity model estimation

A gravity model estimation is a generalized model framework often used in international economics to predict bilateral trade flows based on a range of specific country characteristics.[93] The model is based on the idea that much of international trade patterns can be explained by the economic size of the trading partners and their physical distance. In the model, "distance" can be broadly interpreted as various sources for international trade costs that affect the relative price of domestic and imported goods. These sources can include physical transport costs, import tariffs, and regulatory barriers, but also factors like language and culture. The higher these costs, the lower the level of international trade.

Most gravity model work has been conducted on traditional trade (as opposed to e-commerce). However, a limited number of empirical contributions suggest an equivalent model could apply to predict bilateral volumes of e-commerce trade flows.[94] The gravity model approach could most likely also be applied to the context of bulk letters (direct and transactional mail). The main reason for the lack of research on online trade is due to the absence of official statistics on online cross-border trade.[95]

Box 12 describes the application of a gravity model approach to the case of global mail and trade flows.

---

93 Tinbergen (1962) was the first to suggest that Newton's law of gravity could be applied to trade flows between countries. Deardorff (1984) concluded that the gravity model is very successful in predicting trade flows. The original Tinbergen model was reformulated by Anderson & Van Wincoop (2003). Since then it has been widely used in trade economics and beyond.

94 This has for example been done by Martens & Turlea (2012) who compared online and offline trade patterns for similar goods within the EU, finding that the standard gravity model performs well in explaining online cross-border trade flows. Earlier work on the same topic has been conducted by Lend et.al. (2012) who also applied a gravity model on online cross-border trade in goods, using a eBay database with cross-border transactions between 62 countries for the period 2004-2007 to estimate a gravity model with explanatory variables such as distance, transport costs, common language, border, legal regime or colonial background and quality of governance.

95 Data on online trade is normally generated by private e-commerce companies who do not publish this data for commercial reasons.

Box 12 Gravity model estimation of global mail and trade flows

The gravity model consists of a regression model where the impact of different variables on inbound mail or trade flows can be estimated based on cross-country, panel data on bilateral mail and trade flows and a range of country characteristics. In the case of cross-border flows of e-commerce packets, relevant variables to include in the model could be: internet access, language, institutional trust, access to payment and shipment methods, shipping costs, cultural factors, etc.

The distortionary effect of terminal dues which are not aligned to the price for last-mile handling of domestic mail could be included in the model as a variable representing the difference between terminal dues and the price for the most comparable domestic letter product.

In this case, the gravity model equation could be written as:

$$\ln(x_{ij}) = \beta_0 + \beta_1 \ln(C_i) + \beta_2 \ln(C_j) + \beta_3 \ln(D_{ij}) + \beta_4 \ln(T_{ij}) + \varepsilon$$
$$\ln(T_{ij}) = d_j - \tau_{ij}$$

Where:

x_{ij}	Mail flow (or cross-border e-commerce) from country i to j
C_i, C_j	Variables of relevant country-specific characteristics
D_j	Variable of relevant joint characteristics, such as transport costs, tariffs, and distance
$d_j - \tau_{ij}$	Difference between *price for last-mile handling of domestic letter post items* in country j and the *terminal due* for an operator from country i delivering in country j

In order to estimate the effect of the different country characteristics on bilateral e-commerce flows, the equation is estimated with methods such as OLS (ordinary least square) or PPML (pseudo-Poisson maximum likelihood) regressions.

Source: Copenhagen Economics

Although it is theoretically possible to construct a model that pins down all the factors that are relevant for bilateral mail and trade flows, this is a highly complex exercise. In particular, availability of relevant data will most likely be a challenge. As acknowledged by previous researchers, comprehensive data on bilateral e-commerce flows is often difficult to obtain.

The main benefits of the gravity model estimation are its high level of generality and high potential for the quantification of distortions overall. The main drawbacks of the gravity model are its high data requirements necessary to derive robust results; little reference to e-commerce and mail flows in previous literature; the difficulties of testing the model, which is very sensitive to misspecification (omitted variable bias); and the difficulties of isolating the effects of terminal dues.

The data necessary for estimating the impact on mail and trade flows are summarized in Table 28.

Table 28 Data for quantification of distortions of global mail and trade flows

Assessment	Data requirement	Data source
Difference in differences analysis	Time series data on inbound flows of e-commerce packets	UPU, e-retailer associations, large e-retailers and market places (e.g. Alibaba, eBay)
	Time series data on inbound flows of e-commerce parcels	E-retailer associations, global integrators (e.g., DHL, UPS) large e-retailers and market places (e.g., Alibaba, eBay)
	Data on changes in terminal dues	UPU
Gravity model estimations	Cross-country panel data on bilateral flows of e-commerce packets/letter mail	UPU, e-retailer associations, large e-retailers and market places (e.g. Alibaba, eBay)
	Cross-country panel data on other explanatory variables, such as distance, internet penetration, language, delivery options etc.	Depends on characteristics included in the model.
	Terminal dues and development in terminal dues	UPU
	Price for domestic last-mile activities	National postal operators

Source: Copenhagen Economics

Transfers between postal operators

Under-compensation of last-mile costs implies a transfer of money from high-cost designated operators to low-cost designated operators. This problem is solved if the terminal dues equal the price for last-mile handling of domestic letters.

Table 29 presents the framework for measuring transfers between postal operators created by the current UPU system for terminal dues.

Table 29 Measuring transfers between postal operators

Questions to answer	Answer/method to find answer
What would the non-distortive terminal dues rate be?	· Price of last-mile handling of domestic letter post items
How would delivery operators, senders and recipients react to the new rate?	· Assume no change in demand
Which volumes are potentially affected by the distortion?	· All volumes subject to terminal dues · Calculate difference between terminal dues and prices for last-mile handling of domestic letters

Source: Copenhagen Economics

One could imagine that the demand for cross-border letters would change as the level of terminal dues change. We have discussed this in relation to the previous distortions. For the purpose of isolating the effect on financial transfers between delivery operators, we assume that demand remains constant. This would indeed be the case if terminal dues do not affect the retail letter post tariffs paid by mailers. In this situation, a change in the terminal dues system would in any case influence the financial position of postal operators, given their bilateral mail flows. This would happen via two channels: import and export of cross-border letter post items.

For import volumes, the financial effect for a specific postal operator would equal the change in terminal dues charged times the volume of inbound cross-border letter post items. The effect will be positive if current terminal dues are below domestic prices for

last-mile activities. For export volumes, the financial effect would equal the change in the terminal dues for the export basket (i.e., containing a mix of export countries) multiplied by the volume of outbound cross-border letter post items.

In the counterfactual situation, terminal dues will most likely increase in some countries and decrease in others. This means that the net effect on the export side will depend on the mix of countries in the export basket. However, since most international mail volumes are sent to industrialized countries (cf. chapter 1) and since terminal dues in these countries often are capped at a rather low level, one could expect that the weighted terminal dues for export mail would increase for most countries in the counterfactual.

The net effect for a postal operator will thus to a large extent depend on whether the operator is a net importer or a net exporter of mail, although the relative change in terminal dues for import and export mail also will have an impact (Table 30).

Table 30 Effect of changes in terminal dues

	Net exporter	Net importer
Relative increase in terminal dues (import terminal dues increase more than export terminal dues)	Net effect unclear	Net gain
Relative decrease in terminal dues (import terminal dues increase less than export terminal dues)	Net loss	Net effect unclear

Source: Copenhagen Economics

Box 13 provides an example of how the transfer effect of terminal dues can be calculated in practice.

Box 13 Estimating transfers between delivery operators

The calculation of transfers between postal operators is divided into two parts: import of cross-border letter post items and export of cross-border letter post items.

For imports, the first step is to collect data on all inbound cross-border items subject to terminal dues. The necessary data contains volumes, countries of origin, and terminal dues received. The second step is thereafter to calculate the counterfactual terminal dues (i.e., the price for last-mile handling of domestic items) that the operators would have received, given the import flows. The third step is to calculate the difference between the terminal dues actually received for imported letter post items and the counterfactual terminal dues that would have been charged in the optimal situation. This calculation should be conducted for all inbound letter post flows and for all designated operators applying the UPU system of terminal dues.

The exercise is very similar for exported letter post items, where the first step is to collect data on all outbound cross-border flows subject to terminal dues. The necessary data contains volumes, countries of destination, and terminal dues paid. The second step is to calculate the counterfactual terminal dues (i.e., the price for last-mile handling of domestic items in the destination countries) that the operators would have paid, given the export flows. The third step is to calculate the difference between the terminal dues paid for export letter post and the counterfactual terminal dues that would have been paid in the optimal situation. This calculation should be conducted for all outbound letter post flows and for all designated operators applying the UPU system of terminal dues.

The net effect per operator is calculated by adding the effects on the import and on the export side.

The table below provides a simple two-country (X and Y) example of this exercise.

Import distortion country X	
Average import terminal due per item for letter post items from country Y	0.5
Average price for last-mile activities per item of relevant domestic product in X	0.7
Average loss/gain per imported letter post item from country Y	-0.2
Yearly volume of imported letter post items from Country Y (m)	500
Total transfer from X to Y (m)	**-100**

Export distortion country X	
Average export terminal due for letter post items to country Y	0.5
Average price for last-mile activities per item of relevant domestic product in Y	0.9
Average loss/gain per exported letter post item to country Y	0.4
Yearly volume of exported letter post items from Country Y (m)	500
Total transfer from Y to X (m)	**200**

In this case, the current terminal dues system results in a transfer of 100 from country Y to country X. In contrast, the optimal situation would have no transfer at all.

Source: Copenhagen Economics

Previous research has provided estimations similar to the one described above based on an assumption that ideal and non-distortionary terminal dues rates equal 80 percent of the domestic list price for a single piece letter. Based on this framework, the total transfer from net "winners" to net "losers" within group 1.1 has been estimated to about 418 million USD (corresponding to 0.3 percent of revenues generated in the European postal sector). [96]

The model used in previous research, its main assumptions, and most important drawbacks are discussed in Box 14.

[96] Campbell (2014)

Box 14 Previous estimations of transfers between operators

Transfers between delivery operators have been estimated in a number of previous publications, primarily developed by James I Campbell Jr. Due to restrictions regarding data availability, the estimations have so far focused on the exchange of letter post among the 34 member countries of the OECD and mail exchanges between OECD and non-OECD countries. The method used for calculating transfers between operators consists of four steps:

1. Estimate letter post flows and mail profiles
2. Estimate UPU terminal dues
3. Estimate "non-distortive" terminal dues
4. Compare net payments with actual vs. with "non-distortive" terminal dues

Estimation of letter post flows and mail profiles
Due to the lack of bilateral data on mail flows, the model assumes a close correlation of export international mail flows with export of commodities and services. Bilateral mail flows are approximated based on OECD data on export trade. Moreover, 80 percent of international mail exported from industrialized countries is assumed to be destined for another industrialized country. All letter post items of unknown origin are assumed to originate from mailers in industrialized countries. Developing countries are assumed to receive twice as much mail as they send to industrialized countries. By not allowing for any impact of terminal dues on mail flows, the model does not capture the entire distortion created by terminal dues (e.g., distortions of global mail and trade flows; distortion of competition).

Estimation of UPU terminal dues
The model calculates terminal dues payments between designated postal operators based on UPU rates. It assumes that all countries apply UPU rates to all bilateral transactions. This does not reflect reality. As the authors acknowledge, several postal operators (especially in Europe) use other agreements for cross-border letters (notably REIMS, but also bilateral agreements).

Estimation of "non-distortive" terminal dues
For letter post items delivered by operators in industrialized countries, "non-distortive" terminal dues are assumed to equal 72 percent of the end-to-end delivery price for domestic single-piece letters. For letter post items delivered in developing countries, terminal dues are assumed to equal 92 percent of the domestic single-piece letter postage.

As the authors acknowledge, the assumption that the cost of last-mile handling of cross-border mail can be approximated by 72 percent of the price for domestic end-to-end delivery of single piece letters is not necessarily correct. A study about postal operators' pricing behaviour, conducted on behalf of the European Commission in 2011, found that single piece items (on average) were priced over 45 percent higher than transactional bulk mail, which in turn was priced almost 50 percent higher than direct mail. This suggests that a 28 percent discount on single piece tariffs may not be enough to reflect the cost of last-mile handling of cross-border letters.

Comparison of net payments with actual vs. with "non-distortive" terminal dues
Net payments are compared for the situations (i) with current UPU terminal dues and (ii) with counterfactual terminal dues. The difference between the two scenarios is considered a distortive transfer between postal operators. Within group 1.1, the transfer from net "winners" to net "losers" has been estimated to about 315 million Euros.

Note: In a subsequent paper In a subsequent paper presented in March 2014, Campbell presented the results of a more sophisticated version of this model using modified assumptions, more recent input date, and the terminal dues agreed by the UPU in 2012.

Source: Campbell, Dieke, Zauner (2011), "Terminal dues: Winners, losers, and the path to reform"; Campbell (2014), "Estimating the Effects of UPU terminal Dues 2014-2017"

The data necessary for measuring the distortions are summarized in Table 31.

Table 31 Data for measuring transfers between postal operators

Data requirement	Data source
Bilateral letter flows	National postal operator, UPU, or national regulator
Terminal dues (paid on exported letters and received on imported letters)	National postal operators
Price for last-mile handling of bulk letters	National postal operators

Source: Copenhagen Economics

4.4 Measuring economy-wide effects of identified distortions

A suitable tool for measuring the economy-wide effects of the most important distortions created by the current system of terminal dues could be a computable general equilibrium model (CGE model). The model could incorporate distortions created by terminal dues as (i) increased costs of producing delivery services (driven by a distortion of competition) and (ii) non-tariff barriers (equivalent to the terminal dues).

CGE models offer a comprehensive way of modelling the overall impact of policy changes on the economy and are often used by global institutions such as the World Bank. The models incorporate many economic linkages and can be used to try to explain medium- to long-term trends and structural responses to policy changes.

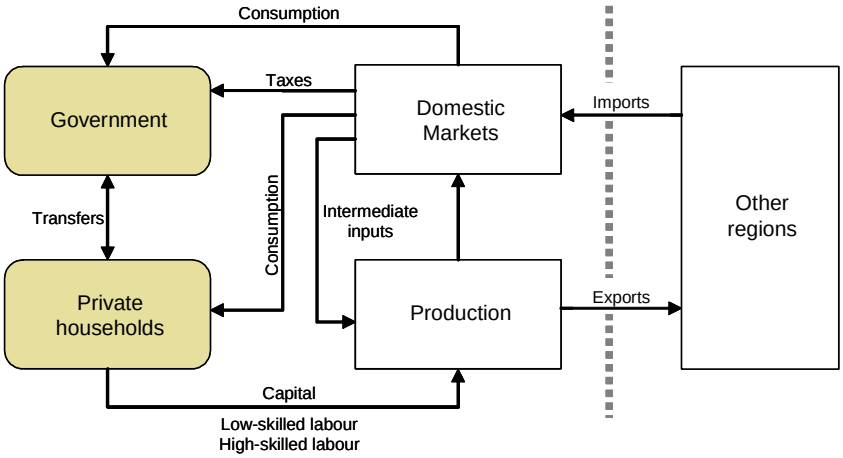
A general equilibrium model for trade analysis could calculate the overall economic gains of restructuring the UPU terminal dues system. Examples of results from the model include effects on total welfare, prices of services, import and exports, output, employment, and GDP. All results can be reported by production sector and country, where relevant.

The model would capture both the direct effects on sectors targeted and the indirect effects on their suppliers, consumers and competitors. Therefore, the model is suitable for answering questions like how much the total cost of the distortionary effect of the current terminal dues system would be when taking all spill-over effects into account.

The CGE model represents a set of regions, which is connected via international trade in goods and services. The model includes most countries in the world but smaller countries are normally aggregated into a single region that is labelled “Rest of the World”. Each of the regions has a representative consumer, a government and a production sector for each of the goods and services in the model.

Figure 22 gives an overview of the markets, the agents and the flows of goods, services and factors in a standard CGE trade model.

Figure 22 Example: CGE trade model



Source: Copenhagen Economics

Firms producing goods and services represent the supply side of the model. All goods and services are being produced with materials and primary factors capital, land and labour. A representative agent represents final demand and he finances his consumption with income from sales of capital, land and labour. Finally, a government provides public goods financed through taxes and duties.

The modelling approach for services builds on recent economic literature, which suggests that close availability of a diverse set of services is important to economic growth. The key idea is that users (firms, governments and households) benefit from a diverse set of services in that more varieties allow the users to purchase a quality adjusted unit of services at lower the costs. The model is therefore able to calculate the effects of differentiation and customisation of services and their implications for investments and trade in services. The model also captures that firms use services as intermediate inputs and that lower costs of inputs lower the prices of services. Thus, lower prices of services not only benefit the firms purchasing the services but also firms, government and households purchasing their output. The model therefore captures the economy-wide effects of barriers to services trade. In this way, the CGE model can analyse how terminal dues spill over to prices for cross-border delivery of letter post items and prices for cross-border e-commerce.

The CGE model represents barriers to services trade in several ways depending on the nature of the barrier. The model incorporates the barriers as price wedges and the size of the wedges are typically based on estimates of the implications for prices found in detailed micro-studies. For example, if the barrier implies that services trade requires extra labour and capital, the model increases the costs of service provision by adding extra costs of labour and capital to the relevant services activities.

In the context of terminal dues, distortion of competition for first-mile and/or last-mile activities caused by terminal dues could result in less efficient (higher cost) production of cross-border delivery services (part of the communication sector). The distortion of competition could thus be included in the model as an increase in the cost of communication.

Alternatively, if the price increase is difficult to attribute to one or a few factors, barriers can be represented as tariff-equivalents analogous to the way non-tariff barriers typically are incorporated for goods trade. In the context of terminal dues, the distortion of global mail and trade flows (caused by discriminatory and sometimes too low terminal dues) can be included in the model as non-tariff barrier equivalent to the terminal dues.

Policy scenarios are implemented via changes in the barriers. For example, a scenario can partially or completely remove the extra costs of capital and labour associated with a given barrier, or it can reduce the tariff-equivalent. In the context of terminal dues, the optimal solution suggested in chapter 3 (terminal dues equal to the price for last-mile handling of domestic letter post items) could have the following implications for the model:

- Cost of service production is reduced (due to increased competition and higher efficiency)
- Non-tariff barriers increase for countries where terminal dues increase and decline for countries where terminal dues decline

The basic steps in the methodology behind the simulations in all scenarios are:

1. Implement information in the model
2. Simulate the baseline scenario
3. Program the model to be able to simulate variants of the policy options. The difference between the baseline scenario and the economic outcomes in these scenarios measures the economic effect of each modelled option.

Due to the fact that the CGE model uses the GTAP database to model effects at a fairly aggregated sector level (postal services belonging to the communications sector), the modelling will rely on a number of assumptions, e.g., regarding the share of communications sector production value affected by terminal dues. Nevertheless, the CGE model has previously been successfully applied to the postal sector to estimate the economy-wide effects of changes in the VAT rules applied to the public sector in EU member states.[97]

Table 32 shows how a CGE model might be applied to the case of terminal dues. As shown in the table below, a CGE model would most likely be able to capture five of the six effects identified in chapter 3. As discussed earlier, the transfers between postal operators will only have an impact on the wider economy in case they spill over to higher taxes or higher prices paid by users of delivery services. The likelihood of this being the case is highly uncertain and the benefit of including this effect in the model would thus be very small.

[97] See Copenhagen Economics (2013), VAT in the public sector and exemptions in the public interest. Report conducted on behalf of the European Commission, DGTAXUD. Report available at http://ec.europa.eu/taxation_customs/resources/documents/common/publications/studies/vat_public_sector_exemptions_en.pdf

Table 32 Application of a CGE model to terminal dues

Distortion	Variable in the CGE model	Effect of implementation of ideal system
Competition for last-mile activities	Cost of communications service provision	Increased competition leads to lower cost providing communications services
Competition for first-mile activities	Cost of communications service provision	Increased competition leads to lower cost providing communications services
Demand for packets vs. parcels	Cost of communications service provision	Increased competition leads to lower cost providing communications services
Global mail and trade flows, domestic vs. cross-border	Non-tariff barrier on communications services	Increased terminal dues leads to less trade, reduced terminal dues leads to more trade
Global mail and trade flows, target vs. transition origin	Non-tariff barrier on communications services	Increased terminal dues leads to less trade, reduced terminal dues leads to more trade

Source: Copenhagen Economics

References

Adrenale Corporation, 2010, "Report: Market Research on International Letters and Lightweight Parcels and Express Mail Service Items," Universal Postal Union website

Australia Post, 2011, "Productivity Commission Retail Inquiry Draft Report: Australia Post Response"

Baratta, Rosario, 2004, "The REIMS II exemption decision: enhancing competition in the cross-border mail market through third party access," *Competition Policy Newsletter*

Buiges, Pierre A., Rosario Baratta, Dag Johansson, and Suzette Schiff, 2003, "The cross-border mail market in the EU: economic context and competition concerns," Third Conference on "Regulation, Competition and Universal Service in the Postal Sector," Toulouse

Campbell, Dieke, Zauner, 2011, "Terminal Dues: Winners, Losers, and the Path to Reform"

Campbell, James I., 1996, Report to the Chairman, Subcommittee on the Postal Service, Committee on Government Reform and Oversight, House of Representatives, "US Postal Service: Unresolved Issues in the International Mail Market," Appendix I, Summary of Terminal Dues

Campbell, James I., 1997 "Evolution of the Postal Function in Long Distance Markets"

Campbell, James I., 1998 "Comment on REIMS II Terminal Dues Agreement"

Campbell, James I., 2002, "History of terminal dues and related issues," *The Liberalisation of Postal Services in the European Union*

Campbell, James I., 2014, "Estimating the effects of UPU terminal dues 2014-2017" (presentation and paper)

Campbell, James I., Alex Kalevi Dieke, Martin Zauner, 2010, "Study on the External Dimension of the EU Postal Acquis," WIK-Consult

Commission for Communications Regulation, 2003, "Information Notice: Terminal Dues Agreements—Compliance with Regulation 10(1) of S.I. 616 of 2002"

Copenhagen Economics, 2012, Pricing behaviour of postal operators, conducted on behalf of the European Commission's directorate for the Internal Market and Services (DGMARKT).

European Commission, 1996, "Notification of an agreement on terminal dues (Reims) between postal operators"

European Commission, 2009, Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings

European Conference of Postal and Telecommunications Administrations and the Regional Commonwealth in the Field of Communications, 2002. "Memorandum of Understanding"

Free & Fair Post, 2012, "FFPI Contribution to the consultation on the ERGP Report on 'Access' to the postal network and elements of postal infrastructure"

Geradin, Damien, 2012, "Legal opinion on the compatibility of the proposed target system for terminal dues with EU law"

Ghosal, Vivek, 1999, "Competition in International Postal Markets: Should the Universal Postal Union's Anti-Remail Provisions Be Repealed?"

Haller, Andreas, Christian Jaag, and Urs Trinkner, 2012, "Termination Charges in the International Parcel Market," Swiss Economics Working Paper

International Competition Network, 2008, Report on Predatory Pricing, Prepared by the Unilateral Conduct Working Group, http://www.internationalcompetitionnetwork.org/uploads/library/doc354.pdf

International Post Corporation, "Managing intercompany pricing," IPC website

Joint Council of Administration and Postal Operations Council report, 2012, "UPU terminal dues system for the period 2014-2017," 25th Universal Postal Union Congress

Legal Information Institute, 2006, "39 US Code Section 3622: Modern rate regulation" (pertaining to the US Postal Service) and "39 US Code Section 407: International postal arrangements"

Leong, Joy M., Daniel Bahar, and Dimosthenis Papakrivopoulos, 2005, "ETOEs—Arbitrageurs or Vehicles of Change in Postal Liberalization?" in *Regulatory and Economic Challenges in the Postal and Delivery Sector*, ed. Michael Crew and Paul Kleindorfer

Miller, T., D. Booth, D. Delehanty, and H. Von Behren, 2004, "Public meeting on UPU Issues: Results of the 2004 Bucharest UPU Congress," US Department of State website

Office for Publications of the European Union, European Commission, 2012, Case No COMP/M.6503 – LA POSTE/SWISS POST/JV Commission decision pursuant to Article 6(1)(b) in conjunction with Article 6(2) of Council Regulation No 139-2004

Pan African Postal Union, "Member Countries" and "Mission Vision & Strategic Objective," PAPU website

Pan African Postal Union, 2012, “Terminal Dues,” PAPU website

PostNL, “International postal regulation,” PostNL website

Regan, Michael J., Director, International Postal Affairs, US Postal Service, 1999 letter to Ambassador Southwick, Bureau of International Organization Affairs, “Time frame for terminal dues proposals, US Postal Service Analysis, Impact on US mailers, and Recommendation”

Somers, Managing Director, Belgian Post International, 2010, “Need for a Clearer Regulatory Framework for Terminal Dues”

Sorensen, Janet M., 2014, “International Terminal Dues White Paper,” Office of Inspector General, United States Postal Service

Swiss Post, “Network Access Partnership: Swiss Post International’s product range for the cross-border wholesale market,” Swiss Post website

Universal Postal Union, 2012, CEP 2012.1—Doc 12c.Add 1.Rev 1.Annexe 3, “Future work on the terminal dues system for 2018-2021”

Universal Postal Union, 2012, Universal Postal Convention

Universal Postal Union, 2013, “Letter Post Manual”, http://www.upu.int/uploads/tx_sbdownloader/actInFourVolumesLetterPostManualEn.pdf

Universal Postal Union, 2013, “Statistics and Accounting Guide”

Universal Postal Union, 2013, Terminal dues impact assessment tool

Universal Postal Union, 2013, “Development of postal services in 2012: A few key preliminary figures,” UPU website

Universal Postal Union, 2013, “Annual Report 2012: Setting the stage,” UPU website

Universal Postal Union, 2014, “Global or regional estimates,” *Administrations*, UPU website

Universal Postal Union, 2014, ”Fulfilling the global e-commerce promise”, conference held on March 24, 2014

Universal Postal Union, 2014,” *Development strategies for the postal sector: An economic perspective”*

Universal Postal Union, 2014, “About terminal dues and transit charges,” UPU website

US Department of State, 2011, “Work of the UPU Councils—October 2010 to April 2011,” Presentation to the Advisory Committee on International Postal and Delivery Services

US Postal Regulatory Commission, 2011, "Order Approving an Additional Inbound Market Dominant Multi-Service Agreement with Foreign Postal Operators Negotiated Service Agreement (with China Post Group)"

US Postal Regulatory Commission, 2012, "Public Representative Comments on Postal Service Notice Concerning Bilateral Agreement with Singapore Post Limited Negotiated Service Agreement"

US Postal Regulatory Commission, 2012, "Public Representative Comments on Postal Service Notice Concerning Type 2 Rate Adjustment and Royal PostNL 2013 Bilateral Negotiated Service Agreement"

US Postal Regulatory Commission, 2013, "Annual Report to the President and Congress: Fiscal Year 2013"

US Postal Regulatory Commission, 2013, "Order Approving an Additional Inbound Market Dominant Multi-Service Agreement with Foreign Postal Operators Negotiated Service Agreement (with Canada Post Corporation)"

US Postal Regulatory Commission, 2013, "Order Approving an Additional Inbound Market Dominant Multi-Service Agreement with Foreign Postal Operators Negotiated Service Agreement (with Korea Post)"

US Postal Regulatory Commission, 2013, "Order Approving an Additional Inbound Market Dominant Multi-Service Agreement with Foreign Postal Operators Negotiated Service Agreement (with Australian Postal Corporation)"

US Postal Service, 2013, "Notice of United States Postal Service of Type 2 Rate Adjustment and Notice of Filing Functionally Equivalent Agreement"

US Postal Service, "Terminal Dues, Transit Charges, and Other International Expenses," "Universal Postal Union," *About*, USPS website

WIK-Consult GmbH, 2013, "Main Developments in the Postal Sector (2010-2013)," Study for the European Commission, Directorate General for Internal Market and Services

Appendix

A.1 Terminal dues rates: Universal Postal Union

Table A.1 Terminal dues rates (SDR): Universal Postal Union

		2014		2015		2016		2017	
Group	**Pays**	**Cap**	**Floor**	**Cap**	**Floor**	**Cap**	**Floor**	**Cap**	**Floor**
1.1	*To other target countries*[1]	0.294 per item, 2.294 per kilogram	0.203 per item, 1.591 per kilogram	0.303 per item, 2.363 per kilogram	0.209 per item, 1.636 per kilogram	0.312 per item, 2.434 per kilogram	0.215 per item, 1.682 per kilogram	0.321 per item, 2.507 per kilogram	0.221 per item, 1.729 per kilogram
1.2, 2	*To other target countries*[1]	0.209 per item, 1.641 per kilogram	0.203 per item, 1.591 per kilogram	0.222 per item, 1.739 per kilogram	0.209 per item, 1.636 per kilogram	0.235 per item, 1.843 per kilogram	0.215 per item, 1.682 per kilogram	0.249 per item, 1.954 per kilogram	0.221 per item, 1.729 per kilogram
3, 4, 5	*Everyone*[2]	Flat rate: 0.203 per item, 1.591 per kilogram		Flat rate: 0.209 per item, 1.636 per kilogram		0.215 per item, 1.682 per kilogram		0.221 per item, 1.729 per kilogram	
3, 4, 5	*Everyone*[3]	4.162 per kilogram		4.192 per kilogram		4.311 per kilogram		4.432 per kilogram	

Note: [1] Country-specific rates based on 70% of domestic tariffs for a 20-gram priority small letter (P) and a 175-gram priority large letter (G). [2] Per item and per kilogram rate for exchanges of 75 tons per year or more. [3] Per kilogram rate for all exchanges of less than 75 tons per year.

The rates applied for flows between countries in the target system in a given year shall not lead to an increase of more than 13% in the base terminal dues revenue before quality of service adjustment for a letter-post item of 81.8 grams, compared to the previous year. For flows under 75 tons per year between countries in the target system as from 2010 and between these countries and countries in the target system prior to 2010, the per kilogram and per item components are converted into a total rate per kilogram on the basis of the average of 12.23 items per kilogram.

Source: Universal Postal Union 2013, "Statistics and Accounting Guide"

A.2 Classification of countries and territories for terminal dues and Quality of Service Fund (QSF) purposes

Table .2 Universal Postal Union classification of countries and territories for terminal dues and Quality of Service Fund

Group	Countries and territories	Postal Development Index (PDI)
1.1	Australia	0.421
	Austria	0.623
	Belgium	0.576
	Canada	0.402
	Denmark	0.669
	Greenland	0.229
	Finland	0.576
	France	0.558
	French Polynesia	0.346
	New Caledonia	0.226
	Wallis and Futuna Islands	0.034
	Germany	0.602
	United Kingdom of Great Britain and Northern Ireland	0.499
	Guernsey	0.545
	Isle of Man	0.627
	Jersey	0.729
	Falkland Islands (Malvinas)	0.299
	Gibraltar	0.447
	Pitcairn Islands	0.149
	Greece	0.268
	Iceland	0.323
	Ireland	0.468
	Israel	0.317
	Italy	0.381
	Japan	0.498
	Luxembourg	0.833
	Netherlands	0.578
	New Zealand	0.336
	Norway	0.927
	Portugal	0.277
	San Marino	0.672
	Spain	0.347
	Sweden	0.556
	Switzerland	0.829
	United States of America	0.575
	Norfolk Island	n/a
	Faroe Islands	n/a
	Tristan da Cunha	n/a
	Liechtenstein	n/a
	Monaco	n/a
	Vatican	n/a
Group 1.2	Aruba	0.285
	Bahamas	0.316
	Hong Kong	0.347
	Kuwait	0.474
	Anguilla	0.267
	Bermuda	0.857
	British Virgin Islands	0.540
	Cayman Islands	0.728
	Turks and Caicos Islands	0.377
	Qatar	0.598
	Singapore	0.445
	Slovenia	0.394
	United Arab Emirates	0.495
Group 2	Antigua and Barbuda	0.151
	Bahrain (Kingdom)	0.190
	Barbados	0.165
	Brunei Darussalam	0.310
	Croatia	0.175
	Curaçao	0.237
	Cyprus	0.309
	Czech Rep.	0.303
	Dominica	0.104
	Estonia	0.223
	Grenada	0.174

	Hungary	0.210
	Korea (Rep)	0.254
	Latvia	0.148
	Macao	0.375
	Malta	0.271
	Cook Islands	0.153
	Montserrat	0.142
	Poland	0.161
	Saint Christopher (St. Kitts) and Nevis	0.131
	Saudi Arabia	0.149
	Sint Maartin	0.237
	Slovakia	0.215
	Trinidad and Tobago	0.174
Group 3	Argentina	0.079
	Belarus	0.091
	Bosnia and Herzegovina	0.058
	Botswana	0.059
	Brazil	0.117
	Bulgaria (Rep.)	0.076
	Chile	0.096
	China (People's Rep.)	0.073
	Costa Rica	0.065
	Cuba	0.063
	Fiji	0.067
	Gabon	0.065
	Jamaica	0.070
	Kazakhstan	0.068
	Lebanon	0.079
	Libya	0.108
	Lithuania	0.135
	Malaysia	0.106
	Mauritius	0.098
	Mexico	0.081
	Montenegro	0.078
	Nauru	0.107
	Niue	0.051
	Oman	0.173
	Panama (Rep.)	0.064
	Romania	0.088
	Russian Federation	0.093
	Saint Lucia	0.102
	Saint Vincent and the Grenadines	0.072
	Serbia	0.077
	Seychelles	0.108
	South Africa	0.076
	Suriname	0.053
	Thailand	0.066
	the former Yugoslav Republic of Macedonia	0.056
	Turkey	0.097
	Ukraine	0.055
	Uruguay	0.092
	Venezuela (Bolivarian Rep.)	0.099
Group 4	Albania	0.037
	Algeria	0.040
	Armenia	0.029
	Azerbaijan	0.046
	Belize	0.037
	Bolivia	0.015
	Cameroon	0.013
	Cape Verde	0.030
	Colombia	0.048
	Congo (Rep.)	0.018
	Côte d'Ivoire (Rep.)	0.014
	Dem People's Rep. of Korea	0.012
	Dominican Republic	0.042
	Ecuador	0.034
	Egypt	0.022
	El Salvador	0.034
	Georgia	0.023
	Ghana	0.015
	Guatemala	0.026
	Guyana	0.025

	Honduras (Rep.)	0.015
	India	0.017
	Indonesia	0.027
	Iran (Islamic Rep.)	0.047
	Iraq	0.020
	Jordan	0.040
	Kenya	0.015
	Kyrgyzstan	0.010
	Maldives	0.051
	Moldova	0.032
	Mongolia	0.016
	Morocco	0.034
	Namibia	0.043
	Tokelau	0.017
	Nicaragua	0.017
	Nigeria	0.010
	Ascension	0.036
	St Helena	0.025
	Pakistan	0.012
	Papua New Guinea	0.015
	Paraguay	0.022
	Peru	0.039
	Philippines	0.020
	Sri Lanka	0.032
	Swaziland	0.044
	Syrian Arab Rep.	0.023
	Tajikistan	0.009
	Tonga	0.046
	Tunisia	0.052
	Turkmenistan	0.039
	Samoa	0.038
	Uzbekistan	0.013
	Viet Nam	0.024
	Zimbabwe	0.005
Group 5	Afghanistan	0.003
	Angola	0.032
	Bangladesh	0.008
	Benin	0.009
	Bhutan	0.019
	Burkina Faso	0.004
	Burundi	0.002
	Cambodia	0.006
	Central African Rep.	0.003
	Chad	0.005
	Comoros	0.021
	Democratic Republic of the Congo	0.001
	Djibouti	0.012
	Equatorial Guinea	0.122
	Eritrea	0.005
	Ethiopia	0.004
	Gambia	0.006
	Guinea	0.043
	Guinea–Bissau	0.004
	Haiti	0.006
	Kiribati	0.026
	Lao People's Dem. Rep.	0.008
	Lesotho	0.011
	Liberia	0.001
	Madagascar	0.003
	Malawi	0.008
	Mali	0.004
	Mauritania	0.007
	Mozambique	0.003
	Myanmar	0.012
	Nepal	0.008
	Niger	0.002
	Rwanda	0.011
	Sao Tome and Principe	0.018
	Senegal	0.009
	Sierra Leone	0.002
	Solomon Islands	0.013
	Somalia	0.000

	South Sudan	.
	Sudan	0.010
	Tanzania (United Rep.)	0.005
	Timor-Leste (Dem. Rep.)	0.018
	Togo	0.008
	Tuvalu	0.054
	Uganda	0.006
	Vanuatu	0.023
	Western Samoa	0.031
	Yemen	0.009
	Zambia	0.010
	Palestine	0.017

Note: Palestine has observer status within the UPU by virtue of resolution C 115/1999 of the Beijing Congress. Maldives and Tunisia were reclassified in Group 4 by the 2013 CA. Latvia has voluntarily acceded to the target system as of 1 January 2014, as a Group 2 country. Specifically concerning the case of the United Arab Emirates, regardless of the provisions in the methodology for the classification of countries for the 2014-2017 period, Congress decided to allow that country to apply the same terminal dues rates as countries classified in Group 3 for the cycle 2014-2017, with that country applying the provisions pertaining to countries in Group 1.2 for the purposes of the Quality of Service Fund and the terminal dues link to quality of service.

Source: UPU 2013 "Statistics and Accounting Guide"

A.3 Sources included in the screening of previous literature (49 in total)

4. Adrenale Corporation, 2010, "Report: Market Research on International Letters and Lightweight Parcels and Express Mail Service Items," Universal Postal Union website
5. Australia Post, 2011, "Productivity Commission Retail Inquiry Draft Report: Australia Post Response"
6. Baratta, Rosario, 2004, "The REIMS II exemption decision: enhancing competition in the cross-border mail market through third party access," *Competition Policy Newsletter*
7. Buiges, Pierre A., Rosario Baratta, Dag Johansson, and Suzette Schiff, 2003, "The cross-border mail market in the EU: economic context and competition concerns," Third Conference on "Regulation, Competition and Universal Service in the Postal Sector," Toulouse
8. Campbell, James I., Alex Kalevi Dieke, and Martin Zauner, 2011, "Terminal Dues: Winners, Losers, and the Path to Reform"
9. Campbell, James I., "Comment on REIMS II Terminal Dues Agreement" (1998) and "Evolution of the Postal Function in Long Distance Markets" (1997), *Collected Papers on Specific Postal Policy Issues*, 2006
10. Campbell, James I., 2014, "Estimating the effects of UPU terminal dues 2014-2017" (presentation and paper)
11. Campbell, James I., Alex Kalevi Dieke, Martin Zauner, 2010, "Study on the External Dimension of the EU Postal Acquis," WIK-Consult
12. Campbell, James I., 2002, "History of terminal dues and related issues," *The Liberalisation of Postal Services in the European Union*
13. Campbell, James I., 1996, Report to the Chairman, Subcommittee on the Postal Service, Committee on Government Reform and Oversight, House of Representa-

tives, "US Postal Service: Unresolved Issues in the International Mail Market," Appendix I, Summary of Terminal Dues
14. Commission for Communications Regulation, 2003, "Information Notice: Terminal Dues Agreements—Compliance with Regulation 10(1) of S.I. 616 of 2002"
15. European Conference of Postal and Telecommunications Administrations, "CEPT," CEPT website
16. European Conference of Postal and Telecommunications Administrations and the Regional Commonwealth in the Field of Communications, 2002. "Memorandum of Understanding"
17. European Union, European Commission, 1996, "Notification of an agreement on terminal dues (Reims) between postal operators"
18. Free & Fair Post, 2012, "FFPI Contribution to the consultation on the ERGP Report on 'Access' to the postal network and elements of postal infrastructure"
19. Geradin, Damien, 2012, "Legal opinion on the compatibility of the proposed target system for terminal dues with EU law"
20. Ghosal, Vivek, 1999, "Competition in International Postal Markets: Should the Universal Postal Union's Anti-Remail Provisions Be Repealed?"
21. Haller, Andreas, Christian Jaag, and Urs Trinkner, 2012, "Termination Charges in the International Parcel Market," Swiss Economics Working Paper
22. International Post Corporation, "Managing intercompany pricing," IPC website
23. Joint Council of Administration and Postal Operations Council report, 2012, "UPU terminal dues system for the period 2014-2017," 25th Universal Postal Union Congress
24. Legal Information Institute, 2006, "39 US Code Section 3622: Modern rate regulation" (pertaining to the US Postal Service) and "39 US Code Section 407: International postal arrangements"
25. Leong, Joy M., Daniel Bahar, and Dimosthenis Papakrivopoulos, 2005, "ETOEs—Arbitrageurs or Vehicles of Change in Postal Liberalization?" in *Regulatory and Economic Challenges in the Postal and Delivery Sector*, ed. Michael Crew and Paul Kleindorfer
26. Miller, T., D. Booth, D. Delehanty, and H. Von Behren, 2004, "Public meeting on UPU Issues: Results of the 2004 Bucharest UPU Congress," US Department of State website
27. Office for Publications of the European Union, European Commission, 2012, Case No COMP/M.6503 – LA POSTE/SWISS POST/JV Commission decision pursuant to Article 6(1)(b) in conjunction with Article 6(2) of Council Regulation No 139-2004
28. Pan African Postal Union, "Member Countries" and "Mission Vision & Strategic Objective," PAPU website
29. Pan African Postal Union, 2012, "Terminal Dues," PAPU website
30. PostNL, "International postal regulation," PostNL website
31. Regan, Michael J., Director, International Postal Affairs, US Postal Service, 1999 letter to Ambassador Southwick, Bureau of International Organization Affairs, "Time frame for terminal dues proposals, US Postal Service Analysis, Impact on US mailers, and Recommendation"
32. Somers, Managing Director, Belgian Post International, 2010, "Need for a Clearer Regulatory Framework for Terminal Dues"

33. Sorensen, Janet M., 2014, "International Terminal Dues White Paper," Office of Inspector General, United States Postal Service
34. Swiss Post, "Network Access Partnership: Swiss Post International's product range for the cross-border wholesale market," Swiss Post website
35. Universal Postal Union, 2013, "Statistics and Accounting Guide"
36. Universal Postal Union, 2013, Terminal dues impact assessment tool
37. Universal Postal Union, 2012, CEP 2012.1—Doc 12c.Add 1.Rev 1.Annexe 3, "Future work on the terminal dues system for 2018-2021"
38. Universal Postal Union, 2014, "Global or regional estimates," *Administrations*, UPU website
39. Universal Postal Union, 2013, "Development of postal services in 2012: A few key preliminary figures," UPU website
40. Universal Postal Union, 2013, "Annual Report 2012: Setting the stage," UPU website
41. Universal Postal Union, "About terminal dues and transit charges," UPU website
42. US Department of State, 2011, "Work of the UPU Councils—October 2010 to April 2011," Presentation to the Advisory Committee on International Postal and Delivery Services
43. US Postal Regulatory Commission, 2013, "Annual Report to the President and Congress: Fiscal Year 2013"
44. US Postal Regulatory Commission, 2013, "Order Approving an Additional Inbound Market Dominant Multi-Service Agreement with Foreign Postal Operators Negotiated Service Agreement (with Canada Post Corporation)"
45. US Postal Regulatory Commission, 2013, "Order Approving an Additional Inbound Market Dominant Multi-Service Agreement with Foreign Postal Operators Negotiated Service Agreement (with Korea Post)"
46. US Postal Regulatory Commission, 2013, "Order Approving an Additional Inbound Market Dominant Multi-Service Agreement with Foreign Postal Operators Negotiated Service Agreement (with Australian Postal Corporation)"
47. US Postal Regulatory Commission, 2012, "Public Representative Comments on Postal Service Notice Concerning Bilateral Agreement with Singapore Post Limited Negotiated Service Agreement"
48. US Postal Regulatory Commission, 2012, "Public Representative Comments on Postal Service Notice Concerning Type 2 Rate Adjustment and Royal PostNL 2013 Bilateral Negotiated Service Agreement"
49. US Postal Regulatory Commission, 2011, "Order Approving an Additional Inbound Market Dominant Multi-Service Agreement with Foreign Postal Operators Negotiated Service Agreement (with China Post Group)"
50. US Postal Service, 2013, "Notice of United States Postal Service of Type 2 Rate Adjustment and Notice of Filing Functionally Equivalent Agreement"
51. US Postal Service, "Terminal Dues, Transit Charges, and Other International Expenses," "Universal Postal Union," *About*, USPS website
52. WIK-Consult GmbH, 2013, "Main Developments in the Postal Sector (2010-2013)," Study for the European Commission, Directorate General for Internal Market and Services

A.4 Overview of screening results

Table A.3 Overview of screening results

Source number	Source name	Transfer of money between designated postal operators	Distortion of international mail flows	Distortion of competition for first-mile and last-mile delivery	Inefficient "foreign aid" subsidy	Distortion of competition between e-retailers in target and transition countries
1	Adrenale Corporation 2010	x	x	x	x	
2	Australia Post 2011	x				
3	Baratta 2004	x	x	x		
4	Buiges et al. 2003	x	x	x		
5	Campbell et al. 2011	x	x		x	
6	Campbell 2006		x	x		
7	Campbell 2014	x		x		
8	Campbell et al. 2010	x	x	x	x	
9	Campbell 2002	x	x			
10	Campbell 1996	x	x	x		
14	European Union 1996		x	x		
15	Free & Fair Post 2012			x		
16	Geradin 2012	x		x		
17	Ghosal 1999	x	x	x		
20	Joint Council 2012				x	
22	Leong et al. 2005		x	x		
23	Miller et al. 2004	x	x	x		
27	PostNL website			x		
28	Regan 1999	x				
30	Sorensen 2014	x				
49	WIK-Consult GmbH 2013	x	x	x	x	x
Total	21 sources	n/a	15	13	15	5	1
Percent of total			71,43%	61,90%	71,43%	23,81%	4,76%

Source: Copenhagen Economics