

MMD

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**Studies on the impact of liberalisation of the postal sector
Lot 5: Modelling and quantifying scenarios for liberalisation
Final report**

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MMD Ltd in association with Hydra Associates

**78-80 St John Street, London EC1M 4HR, England
Tel +44 171 251 3925; Fax +44 171 251 4038
E-mail Mail@MMD-London.com**

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1. SUMMARY

MMD has constructed a computer-based model of certain types of possible liberalisation of postal services across the European Union. The objective is to support the European Commission in preparing its proposals for further liberalisation of the sector.

The model brings together the findings of the four “sector” studies that have been undertaken over the last year by other consultants. These cover the possible liberalisation of direct mail, cross-border mail, mail above certain weight or price thresholds, and access for competitors to the network of the universal service provider in each Member State. These studies are the source of the information used in the model. The model also draws on separate studies done for the Commission on the cost of the universal service, and on employment trends in European postal services. These are used to provide first approximations of the effect of possible liberalisation on the profitability of European postal services and on postal employment levels.

There has been some need to reconcile divergent information from different sector studies. Where we have had to fill gaps, we have done so in a simple and transparent manner, without seeking to redo the work done in the sector studies. Aspects concerned include:

- Underlying growth in the postal markets
- The allocation of cross-border flows between sending and receiving countries
- Entry strategies for competitors in liberalised services
- The sensitivity of postal business to changes in price and quality
- The extent to which particular kinds of liberalisation may induce artificial shifts in postal business
- The extent of the efficiency gains to be expected as a result of competitive pressures following liberalisation

- The scale of network access charges if the universal service provider is required to give access to competing operators
- The relationship of different kinds of liberalisation to changes in employment
- The way costs are likely to change with changes in market share.

The model operates through a linked series of sub-models covering different aspects of the issues involved. It is implemented in three levels:

- a *macro shell* designed to give the user a simple way of specifying the type and timing of liberalisation to be considered, and the entry strategy to be assumed for competitors coming in after liberalisation
- an *intermediating layer*, which stores the basic information on the various postal markets covered, converts user inputs into the form needed for the calculations, manages the calculations required, and reports the results in various forms and levels of detail, as the user may wish, and
- an *engine* at the heart of the model, which carries out the calculations required for each scenario or “case” which the user wants to run.

The whole model is designed to run quickly on a personal computer using Excel spreadsheet software.

The model has been designed to replicate the findings of the sector studies on the basis of the assumptions cited in the studies. It does so in a way that makes it possible to try out the effect of a wide range of other possible combinations and timings of liberalisation. This report presents the results of one set of possible liberalisation scenarios.

The main findings can be summarized as follows:

- Status Quo: no further liberalisation
 - ◇ Significant growth in the volume of mail carried by universal service providers, 15% in ordinary mail and over 50% for direct mail
 - ◇ Total market growth slightly faster than the growth in volumes carried by universal service providers
 - ◇ Universal service providers, in aggregate, see profits more than double over ten years.
- Full liberalisation of direct mail, cross border mail and ordinary mail in all weight bands
 - ◇ USP ordinary mail revenue grows, but more slowly than volumes, as prices are cut to defend market share
 - ◇ USP direct mail has the most revenue growth

- ◇ Total market revenues fall slightly when compared with the Status Quo, as lower prices outweigh higher volumes
- ◇ Profit margins on reserved business for universal service providers fall on average to 1%, with seven out of the fifteen universal service providers making losses, compared to three in 1997.

An intermediate scenario, with liberalisation in 2003 of direct mail, cross-border mail and ordinary mail items weighing over 50g, sees a sharp growth in cross-border mail, resulting from the assumed impact of induced cross border mail. A variant of that scenario, under which liberalisation of remaining weight bands is completed in 2005, means that that anomaly is corrected in 2005. By 2007, the result has come very close to that of full liberalisation in 2003. The path there is somewhat easier for the universal service providers with liberalisation in two steps rather than one.

The model is now available to the European Commission to run any other scenarios that may be of interest as the debate on further liberalisation of the postal sector moves forward.

2. INTRODUCTION

This Final Report is submitted under the terms of contract number 71063 between the European Commission and MMD covering work on modelling scenarios for the liberalisation of postal services across the European Union. It draws on a number of studies undertaken over the last year on behalf of the European Commission on various aspects of postal liberalisation, in preparation for the presentation by the European Commission of new proposals in the field of postal liberalisation, as envisaged in Directive No. 97/67/EC.

3. OBJECTIVES

3.1. Overall objectives of the model

The assignment reported here has been to construct a model of certain types of postal liberalisation. The purpose of the model is:

- to provide support for the Commission in preparing its new proposals
- to reconcile and combine the findings of the sector studies
- to highlight key, quantified outcomes of various kinds of possible liberalisation of postal services.

The model does this by bringing together the findings of the four “sector” studies, which have looked at different types of liberalisation:

- Liberalisation of direct mail (Arthur Andersen, 1998)
- Liberalisation of clearance, sorting and transport (CTcon, 1998)
- Liberalisation of incoming and outgoing intra-Community cross-border mail (PricewaterhouseCoopers, 1998)
- Study on the weight and price limits of the reserved area in the postal sector (CTcon, 1998).

In the course of the assignment we have also been asked to look at the implications of liberalisation for the profitability of the universal service provider, and for employment in postal services. In doing that, we have drawn on two other studies undertaken for the European Commission:

- Costing & financing of universal services in the postal sector in the European Union (NERA, 1998)
- Employment trends in the European postal sector (Price Waterhouse, 1997).

The model thus serves to focus the whole study effort undertaken over the past year to support the Commission’s deliberations on its new proposals for postal liberalisation.

3.2. Benefits of the model

The sector studies have each examined the consequences of one particular type of liberalisation of postal services. They have accumulated a mass of information, much of it from surveys of market participants. The consultants carrying out the sector studies have used different methodologies. The inevitable lack of uniformity in the data makes it difficult to have a clear vision of what is a very complex situation.

We have sought to organize and analyze the various sources of data, and to bring consistency to the information collected, without attempting to second-guess the sector studies. The MMD model provides a structure that pulls the data together and allows many liberalisation scenarios to be tested in a simple but effective manner. Scenarios can be run for any number of different combinations of types and dates of liberalisation. These can provide useful insights into the dynamics of the postal market and how these dynamics will change after liberalisation.

3.3. Liberalisation and deregulation

The model is concerned with the liberalisation of postal markets. That is, it deals with the impact of removing legal barriers to competing operators offering postal services. Impact is measured in terms of:

- the volume of mail carried by different operators, the prices they charge, the quality of service they offer and the revenue they derive from carrying mail
- the number of people they employ.

It is important to remember that liberalisation in this sense is not the same as deregulation. Even a fully liberalised market for postal services is likely to remain a regulated market. This is for two reasons:

- the universal service, and
- consumer protection.

First, Member States seem likely to remain under an obligation to ensure the provision of a universal postal service, at least to the standard defined in Directive No. 97/67/EC. The universal service is at present financed by cross-subsidy within the monopoly, or near monopoly, exercised by the universal service provider in each Member State. The Directive envisages that certain aspects of postal service may remain reserved to the universal service provider, so as to allow such cross-subsidy to continue.

Liberalisation will erode cross-subsidy. Competitors will aim at the universal service provider's most profitable business. They will probably also make the universal service provider reduce its prices to preserve market share. There are other ways to finance the universal service. The principal alternative envisaged by the Directive is a levy on all competing postal operators, to finance the subsidy needed by the universal service provider. To levy other operators, the government needs to know who they are, and probably how much postal business they are doing. It will also need to

police any area of postal services that it wishes to reserve to the universal service provider, and to punish those who infringe the boundary set.

For these reasons it is likely that postal operators will be licensed by government even in a fully liberalised market.

Secondly, liberalisation of the postal services market carries risks as well as potential gains for consumers. In particular, there may be difficulties for consumers in finding out what services are on offer from whom at what price so that they can make informed decisions. There may be difficulties over divergent conditions of carriage (e.g. responsibility in the event of loss) from different operators, unless some way is found of enforcing common conditions.

Political concern about this kind of consumer issue may lead to more rather than less regulation in a liberalised postal services market, perhaps including a postal services regulator with powers to license and sanction operators and to investigate consumer complaints. Liberalisation of postal services will thus need to be undertaken in the light both of evolving general EU policy on consumer protection in services, and the possibility of specific consumer protection legislation for a liberalised postal sector.

These wider issues are not covered in the sector studies, nor in the present report.

3.4. Objectives of the present report

This report sets out:

- the types of liberalisation covered in the model
- the way in which the model relates to the sector studies, and the cost and employment studies
- a description of the model and its sub-models
- a set of scenario results from runs of the model under different assumptions.

We report here on four scenarios (and one combination), at the level of the European Union as a whole. These are:

- A reference scenario covering the status quo, that is assuming no further liberalisation after the implementation of the requirement in Directive No. 97/67/EC to liberalise this year all mail items weighing more than 350g.
- Partial liberalisation in the form of liberalisation in 2003 of all mail items weighing more than 50g
- Partial liberalisation in the form of liberalisation in 2003 of all direct mail and all cross-border mail, and of ordinary domestic letter mail items weighing more than 50g
- Full liberalisation in 2003 with no reservation to any EU universal service provider of any type of postal traffic from that date

- A combination of the last two, that is a two-stage liberalisation, partial in 2003 and then complete in 2005.

Annexes to the report, which are not for publication, contain more detailed reports on these scenarios and summary reports on a range of scenarios which the European Commission has asked us to run.

4. TYPES OF LIBERALISATION

4.1. Overview

Postal services can be restricted or liberalised in a variety of different ways. The model covers the possible liberalisation over a ten-year period (1998-2007) of postal services that currently (in most Member States) may legally be provided only by a single operator in each Member State.

This single or dominant operator is described in this report as the universal service provider (“USP”). That description is not intended to imply anything about the extent of the universal service provided in any particular Member State, nor about the nature of the universal service obligation. It is merely convenient shorthand for the various organizations, of different scope and legal status, which occupy this position in the different Member States.

Some Member States have already liberalised all aspects of postal service (Finland, Sweden), or important parts (mail items weighing more than 200g in Germany, for instance, local mail in Spain, direct mail in several Member States).

The four types of liberalisation covered by the present exercise are the liberalisation of:

- direct mail
- cross-border mail
- mail exceeding certain weight (or price) limits
- access by competing operators to the sorting, transport and distribution network of the universal service provider.

4.2. Direct mail

Liberalisation of direct mail covers for the purposes of this report any mail classified as direct mail in the legal act that governs its liberalisation. Such mail may, from the date of liberalisation, be collected, outward sorted, transported, inward sorted and delivered by other players, as well as by the universal service provider in the Member State in question.

Unless network access is also liberalised, any other player carrying direct mail is assumed to need to provide a full, end-to-end service. If network access is also liberalised, then any other player carrying direct mail need not itself carry the direct mail from the originator to the recipient. It may

instead pass it, after collecting it, back to the universal service provider at any subsequent stage of the value chain (outward sorting, transport, inward sorting, delivery) to which access has been liberalised.

4.3. Cross-border mail

Liberalisation of cross-border inward mail means, for the purposes of this report, that any mail entering one Member State from another may be carried from the frontier to the final recipient by other players, as well as by the universal service provider in the Member State in question. Such a player may, or may not, have been involved in the collection and outward sorting of cross-border mail destined for the Member State in question.

Unless network access is also liberalised, any other player carrying cross-border inward mail is assumed to need to carry it from the frontier to the final recipient. If network access is liberalised, then any other player carrying cross-border inward mail may, instead of providing the whole of this service itself, pass the mail on to the universal service provider at any subsequent stage of the value chain (transport, inward sorting, delivery) to which access has been liberalised.

Liberalisation of cross-border outward mail means, for the purposes of this report, that any mail posted in one Member State to an address in another may be carried from the originator to the frontier by other players, as well as by the universal service provider in the Member State in question. Such a player may, or may not, also be involved in the inward sorting and delivery of the cross-border mail in the Member State of the recipient.

The model (like the PricewaterhouseCoopers sector study) thus ignores mail entering the European Union from the rest of the world, or posted in the European Union to addresses in the rest of the world. For the European Union as a whole, cross-border mail with an origin or destination outside the European Union represents 35% of total cross-border mail (PricewaterhouseCoopers, page 25).

4.3.1. Induced cross-border mail

The PricewaterhouseCoopers study alludes to the issue of induced cross-border mail. This is domestic mail, which might become cross-border mail if cross-border mail (of a particular type or weight) is liberalised before domestic mail. It might take the form of actual A-B-A re-mail, where items are posted from country A to country B and back to country A. Perhaps more likely, it might take the form of virtual A-B-A re-mail. This is where the originator in one country transmits information electronically to another country and there generates a message that is mailed to the first country.

Induced mail of this kind is clearly the preserve of large and sophisticated originators. But both in direct mail and in financial mail, which are significant elements in the business of all universal service providers, there are such originators who might react in this way to cross-border liberalisation, if it comes ahead of domestic liberalisation. The likelihood is also discussed in the PricewaterhouseCoopers study that once a competing operator has entered the inward cross-border mail market, it might attract domestic mail even if domestic mail is in principle still reserved.

There is little information in the sector study on the likely scale of this effect. The model assumes that if inward cross-border mail is liberalised ahead of domestic mail, then the cross-border competitors will take from the universal service provider a share of domestic mail as well as a share of existing cross-border inward mail. This applies both to direct mail and to ordinary (domestic non-direct) mail. In Table 4.3 (page 80) PricewaterhouseCoopers offer various scenarios for the scale of market share loss resulting from A-B-A re-mail, which range from 2.5% to 16%. The central case is that 30% of domestic letter mail is potentially convertible into A-B-A re-mail, and that 30% of that would in fact be so converted.

The model accordingly starts by assuming the share of domestic mail taken in this way to be 9% (30% of 30%) of each of direct mail and ordinary mail. This is a major assumption. 9% of domestic mail is a substantially greater volume of mail than the whole of existing cross-border mail in all but two Member States. Thus the effect of liberalising cross-border mail first, on this assumption, is generally felt much more in what was domestic mail than in existing cross-border mail. Further, 9% is in a number of Member States a higher proportion of domestic mail than the model assumes the universal service provider to be likely to lose to competitors if domestic mail itself is fully liberalised.

Accordingly, the model constrains the induced cross-border effect. If the effects used in the model for the liberalisation in a particular Member State of domestic mail (on the basis of the CTcon study) or direct mail (on the basis of the Arthur Andersen study) are below 9%, it is the lower figure which the model takes for the induced cross-border effect.

4.3.2. Cross-border outward mail

Cross-border outward mail, on the originator's side of the frontier, is reported by PricewaterhouseCoopers to be already liberalised, at least *de facto*, in most Member States.

PricewaterhouseCoopers suggest that *de jure* liberalisation of outward cross-border mail which is already liberalised *de facto* would shift 3% of EU cross-border mail from the universal service providers in each Member State to other operators (Table 4.2, page 73, case 3 compared to case 2 in respect of the outward activities of collection and outward sorting).

The five respondents cited in that study as offering a view on the impact of liberalisation of outward cross-border mail suggested a loss of volume market share by the universal service provider of some 15% attributable to the liberalisation (Table 3.12, page 59, 2006 compared to 2001). These respondents are not identified, but presumably include at least some Member States where outward cross-border mail is still reserved *de facto* to the universal service provider. Table 4.2 suggests a 10% loss of market share in moving from reserved outward cross-border mail to *de jure* liberalisation (case 3 compared to case 1).

As in other cases, we have not sought to verify these findings independently. As 3% of intra-EU cross-border mail represents a very small proportion of total EU mail flows, the figure chosen is not of great significance at the level of the European Union as a whole.

Among the Member States, the effect of liberalising cross-border mail, either outward or inward, is likely to be of greatest importance in Luxembourg. Cross-border mail is already of great significance there (36.5% of total flows), and A-B-A re-mail is physically very easy. The

Luxembourg postal authorities believe that liberalisation of cross-border mail would automatically lead to *de facto* liberalisation of all domestic mail. The model accordingly allows cross-border liberalisation in Luxembourg to be treated as a special case, as tantamount to full liberalisation of all mail flows.

The other Member State in which cross-border flows are of major importance is Ireland. However, PricewaterhouseCoopers report that both inward and outward cross-border mail is already liberalised *de facto* in Ireland (Table 2.2, page 16, and Table 2.3, page 18). Thus *de jure* liberalisation does not seem likely to have so significant an effect there.

4.3.3. Terminal dues

The universal service provider in the recipient country receives payment for transporting, inward sorting and delivering inward cross-border mail. How much it receives depends on the “terminal dues” system in place between the universal service providers in the two Member States in question, or between the universal service provider in the recipient and any other postal operator in the country of the sender. We have no information from the PricewaterhouseCoopers study on which terminal dues system applies where: there are several in use in the European Union.

Thus the model uses the simplifying assumption that the recipient universal service provider is paid a proportion of its domestic price for the type of mail in question, which matches the proportion of its costs attributed by the CTcon study on network access to the stages of the postal value chain which it handles (part of transport, plus all of inward sorting and delivery). Cross-border inward prices in the model remain linked to domestic mail prices in this way if domestic mail is liberalised but cross-border mail is not, a situation in which domestic mail prices will typically fall.

The PricewaterhouseCoopers study assumes that a substantial proportion of induced cross-border mail will be handled, in the Member State of the recipient, by the universal service provider, and thus that terminal dues will be payable to the universal service provider on such mail (Table 4.3, page 80). This assumption is not discussed in the study. It seems to us a difficult one, since the point of the induced cross-border mail is to escape the domestic costs (or the quality) of the universal service provider. The model thus assumes, instead, that all induced cross-border mail will be carried by competitors and not by the universal service provider in the Member State of the recipient.

4.4. Liberalisation by weight/price band

Liberalisation of mail by weight/price band covers for the purposes of this report any items of mail previously reserved, but exceeding in weight or price whatever threshold is set in the legal act liberalising it. Such mail may, from the date of liberalisation, be collected, outward sorted, transported, inward sorted and delivered by other players as well as by the universal service provider in the Member State concerned.

Unless network access has also been liberalised, any other player carrying mail that exceeds the weight/price thresholds reserved to the universal service provider is assumed to need to provide a full, end-to-end service. If network access has been liberalised, then any player carrying mail which exceeds the weight/price threshold reserved to the universal service provider does not need to provide a full service itself. It may instead pass the mail, after collecting it, back to the universal

service provider at any subsequent stage of the value chain (outward sorting, transport, inward sorting, delivery) to which access has been liberalised.

4.4.1. Thresholds

The model assumes that the liberalisation of price thresholds can be assimilated to the liberalisation of weight thresholds, and that the weight thresholds to be considered are:

1. more than 350g (due to be liberalised from 1999 under Directive No. 97/67/EC)
2. 301g - 350g
3. 251g - 300g
4. 201g - 250g
5. 151g - 200g
6. 101g - 150g
7. 51g - 100g
8. 21g - 50g
9. not exceeding 20g.

4.4.2. Induced weight shifts

The model allows for sophisticated originators of mail to react to the liberalisation of one weight band but not another, by changing the characteristics of the mail they send so as to benefit from the liberalisation.

This is done in the model by adding to the market share obtained by competitors in the liberalised weight band(s) a proportion of the mail previously handled by the universal service provider in the next weight-band down.

By way of illustration, let us suppose that the carriage of mail items weighing over 150g is liberalised. Let us further suppose that the model calculates that with a given entry strategy the competition wins 10% of the mail in the weight-band 151-200g. The model then allocates to the competitors, in addition, a share of the universal service provider's business in the weight-band 101-150g, that is the highest weight band which is still reserved to the universal service provider. The assumption here is that originators of bulk mail such as bulk direct mail or financial mail start to send more mail in the heavier weight-band and less in the lighter, because the heavier has been liberalised and the lighter has not.

The sector studies provide no evidence on the likely scale of this effect. We have incorporated it in the model with the assumption that 2% of non-direct mail and 3% of direct mail in the next weight-band down will migrate to the competitors across a weight-band boundary. We emphasize that this is an important assumption, particularly if liberalisation is contemplated in the lower weight bands

where most mail is concentrated. Even a 2% migration from the next weight band down is a large number of items, and significant in relation to likely market shares obtained by competitors in (smaller) liberalised weight bands.

4.4.3. Precedence of weight-band liberalisations

The liberalisation of any of the nine weight bands mentioned is assumed to include the liberalisation of all heavier weight bands. Thus if, say, mail in the category 101g-150g is liberalised, then all mail above 100g is liberalised. There will not be a higher band (such as 301g-350g) which is still reserved to the universal service provider.

4.5. Liberalisation of network access

Liberalisation of network access means for the purposes of this report that the universal service provider in the liberalising Member State is obliged to offer to other players access on reasonable terms to its facilities for outward sorting, transport, inward sorting and delivery of mail. The model allows for access to these different stages of the value chain to be liberalised at different times in any one Member State, or for access to one or some to be liberalised while no access is provided to one or more other stages. Thus a Member State may require access to the delivery service of the universal service provider but not to its outward sorting or transport facilities.

The model assumes that for each Member State there is a fixed proportion of the universal service provider's costs that relate to the different stages of the value chain. These proportions are given for each Member State in the CTcon study on network access. Any other player using liberalised network access will pay an access charge to the universal service provider. The scale of network access charges is commonly a controversial subject. It has not been addressed in any of the studies on which our model has drawn. For the purposes of the model, we have made a simple assumption about network access charges. This is that the access charge equals that proportion of the end-to-end price charged by the universal service provider for comparable mail which represents the cost of the stages of the value chain handled for the other player by the universal service provider.

For example, let us assume that the universal service provider charges 100 units for end-to-end carriage of the type of mail in question. Let us further assume that 10% of the universal service provider's costs relate to transport. The model then assumes that any private player taking advantage of liberalised access to the universal service provider's transport network pays the universal service provider 10 units for transporting each item of its mail. Thus the access charge used in the model, purely for illustrative purposes, does not vary with the price that the other player may choose to charge its customers for end-to-end service; nor with the respective market shares of the universal service provider and its competitors.

The model assumes that only the universal service provider is obliged to provide other players with access to its network.

5. INTERACTION WITH OTHER STUDIES

The MMD modelling study sits across the four sector studies. They are the main source of information for the model. In this section we discuss what information the model has sought from the sector studies, what it has taken, and how we have dealt with the need in various places to reconcile or supplement the information provided in the sector studies.

The Arthur Andersen study deals solely with direct mail. It is the prime source for the impact of liberalisation on the direct mail market for the MMD model. It is the source for the base data on direct mail for those countries where the CTcon study does not provide any (that is, those countries where direct mail is already liberalised).

The price and weight band distribution of mail identified by the CTcon price/weight band study is applied to all three types of mail covered in the model, that is direct, ordinary (domestic letter mail other than direct mail) and cross border mail. This study is also the prime source of base data for both ordinary mail and direct mail (except for those countries where direct mail data is not provided in this study, that is, those countries where direct mail is already liberalised).

The access study by CTcon, while primarily concerned with ordinary mail, has also been applied to cross border mail by MMD. A key finding from the access study is that access liberalisation is expected to have no impact on direct mail. This study has also been used in the cost sub-model.

The cross border study by PricewaterhouseCoopers is the prime source for the cross border data and quantifications in the model, with the CTcon and Arthur Andersen findings applied to induced cross-border estimates.

The study by NERA into the cost of providing a universal postal service and the Price Waterhouse study into the future of employment trends in postal services in the European Union have been used to feed the cost and employment sub-models respectively.

MMD held a workshop in June 1998, where the views of various postal administrations were sought on some of the key quantifications. Where the sector studies do not provide numbers, we have used the quantifications discussed there.

MMD has looked to the sector studies for:

- Data, to populate the model and make it correspond to the real world
- Quantification of the key drivers of the market, including factors such as:
 - ◇ Economic
 - ◇ Technological
 - ◇ Price
 - ◇ Quality

- Entry strategies that will help us simulate the impact of liberalisation on the markets.

5.1.1. Key data

The key data needed for the model is information on volumes, prices, costs and employment, in as much detail as possible. The model needs it broken down by country, type of mail (direct mail, other domestic letter mail, cross-border mail), and by weight band. In some cases information has also been provided by business segment.

5.1.2. Key quantifications

We are looking here, in as much detail as the data permits, for insights into interactions between the key players, and how price and quality of service affect both the total market and the market share of different players. The study is by country, by type of mail, by weight band and so far as possible by business segment. The rate of underlying growth also matters. It is not a feature that distinguishes one liberalisation scenario from another. But it may make a critical difference to the acceptability of the consequences of liberalisation. Losing 10% market share is a significantly different proposition in a market which has grown by 15% than in one which is static or falling.

5.1.3. Key entry strategies

A major role of the sector studies is to provide information on how competitors are likely in practice to come into segments of the postal market which are liberalised. This “entry strategy” is defined in the model in terms of:

- Pricing strategy by competitors relative to the universal service provider
- Quality offering by competitors relative to the universal service provider
- The price and quality response of the universal service provider.

The model also assumes that new entrants will obtain some share of the market even with an offer which, taking both price and quality into account, is equivalent to that of the universal service provider. The business logic of this assumption is that for some customers the particular mix of quality and price offered by a new entrant will be superior to the universal service provider’s offer. That will be the case even if on average the offers are comparable. In addition, large mail users will want a second supplier if they can have one, and new entrants are likely to try harder in marketing terms and in targeting particular types of postal business.

5.2. Direct mail study

5.2.1. Key data

The Arthur Andersen direct mail study provides data for those Member States for which the CTcon study does not give direct mail figures, on:

- Base year volumes and revenue

- ◇ Business to business
- ◇ Business to private
- ◇ Large users
- ◇ Small users
- ◇ Universal service provider
- ◇ Competitors

5.2.2. Key quantifications

The core of the direct mail study in terms of quantifications lies in the market demand model. Following the Universal Postal Union's 1997 study ("Post 2005: Core Business Scenarios") this looks at economic, demographic, social and technological factors, together with price and quality. The Arthur Andersen study uses technology change as a positive factor in the direct mail market. The output can be summarized as follows, in terms of the impact of a 1% increase in a key variable on direct mail volumes:

- GDP +0.9%
- Technology +1.0%
- Price -0.8%
- Quality +0.4%

5.2.3. Key entry strategies

The Arthur Andersen study presents two scenarios for the future of direct mail. By comparing these scenarios we can gain insights into the entry strategies they imply.

The base scenario is the status quo, with underlying economic and technological growth, improvements in quality and static prices.

The alternative scenario is the liberalisation scenario with market growth, and the underlying economic and technological growth as before, but coupled with extra quality improvements on the part of the universal service provider and falling prices.

5.3. Price/weight band study

5.3.1. Key data

The CTcon study on weight bands is the only source of data included in the model for weight band liberalisation. For the sake of consistency, it is the prime source of base data on direct mail, as well as on ordinary mail in the weight bands that may be reserved to the universal service provider.

Taking base year volumes and revenues, it provides splits between ordinary and direct, business and private and urban and rural mail. These are used to generate for each Member State an amount of mail which competitors are likely to consider attractive in each weight band.

5.3.2. Key entry strategies

The study offers four scenarios for the effect of liberalising a weight band, in terms of the proportion of attractive mail in the weight band concerned which is lost to competitors after liberalisation, and the reduction in price which results for the mail the universal service provider keeps. Two of these scenarios are described as relevant for Member States where the universal service provider already gives a high quality service, and two for the Member States where existing service is of low quality. Competition in the first category is described as likely to be primarily on price, while in the second it will be primarily on quality. By comparing each pair, it is again possible to obtain insights into the entry strategies implied.

5.4. Access study

5.4.1. Key data

The CTcon study on access liberalisation provides information on ordinary, direct, business and private mail. It also gives estimates for each Member State of the proportion of costs represented by the main stages in the value chain (collection, sorting, transport and distribution). In several, but not all, cases the study also identifies an element of fixed costs that are not allocated to any of the functions in the value chain.

5.4.2. Key entry strategies

The access study clearly identifies the target market as being bulk business letters and not direct mail. It presents three scenarios of the impact of liberalisation on new entrant market share, and on the price of the mail that continues to be carried by the universal service provider.

5.5. Cross border study

5.5.1. Key Data

The cross border study provides data on base year volumes and revenues, with the data split into outbound, inbound, direct mail, ordinary mail, business mail and private mail. The study describes the various “terminal dues” arrangements, which currently govern the payments that European universal service providers make to each other for handling cross-border mail. It does not specify which apply in which bilateral relationship. Applying these arrangements naturally requires information to be kept on how many items go from each country to each other country. The PricewaterhouseCoopers study does not, however, show any breakdown of cross-border flows by origin and destination.

We have accordingly used a simple rule of thumb to allocate cross-border flows. We have assumed for the purposes of the model that cross-border mail from any one Member State is distributed among the other Member States in proportion to the scale of their domestic mail flows of the same type. This ignores what are in practice significant mail flows between Member States and countries

outside the European Union. No doubt it also matches only imperfectly the actual distribution of cross-border mail between Member States: for one thing it ignores the clearly important effects of geographical proximity and language. But in the absence of any other information, it provides a simple and transparent way of allocating the flows.

5.5.2. Entry strategies

The cross border study presents the results of the impact of cross border liberalisation by comparing four cases:

Outbound and inbound regulated:	0% market share for new entrants
Outbound <i>de facto</i> liberalised and inbound regulated:	7% market share for new outbound entrants, 1% market share for new inbound entrants
Outbound liberalised and inbound regulated:	10% market share for new outbound entrants, 3% market share for new inbound entrants
Outbound and inbound liberalised:	20% market share for new outbound entrants, 14% market share for new inbound entrants.
<i>Source: PricewaterhouseCoopers cross-border study, page 73</i>	

The first of these applies in five Member States. The second represents what the consultants describe as the reality in most Member States. The last case applies in two Member States.

5.6. Summary of sector study findings

5.6.1. Key data

Volumes

Both the CTcon studies and the Arthur Andersen study give figures showing the volume of direct mail. These figures are not consistent, and in respect of some Member States significantly different. For the purposes of the model we have taken the base-year direct mail volume figures from the CTcon study, for the sake of consistency with the other domestic mail figures. Where direct mail has already been liberalised and CTcon therefore do not give figures, the Arthur Andersen numbers have been used. Overall, EU letter mail volumes in 1997 comprised 70% ordinary mail, 27% direct mail and 3% cross-border mail within the EU. The study by PricewaterhouseCoopers (page 25) shows total cross-border mail as 6.3% of domestic mail. But that figure includes mail to and from the rest of the world, as well as within the EU; it also includes both outward and inward mail, which in terms of the number of items of mail within the EU is double counting.

Weight band distribution

Almost three-quarters of ordinary mail weighs less than 20g and nearly 90% less than 50g. Direct mail tends to be a little heavier. Still, almost half of all direct mail weighs less than 20g, and more than 70% less than 50g.

Economic growth

A key input to the rate of underlying growth in postal services is the assumption made about the rate of economic growth through to 2007. We have used the growth forecasts published for all Member State economies by the European Commission in October 1998 for the period up to 2000. For the period after 2000, we have simply projected the historical growth rates which each Member State has in fact experienced over the ten years to 1995, in order to extend the forecast through to 2007. These are not the same as the economic growth projections used by Arthur Andersen or by CTcon. We make no claim that the ones we have used are what is likely to happen: merely that this is a simple and transparent way of projecting underlying growth on a consistent basis.

The average rate of economic growth in the model over the period is just over 2% a year, with Ireland and Luxembourg way ahead, Ireland at 7% and Luxembourg at just over 5%. These high figures of course reflect the successful performance of these two economies over the last ten years.

Price by weight band

All prices in the model are in constant terms (net of inflation). Following the CTcon weight-band study, they are in 1998 money converted into ECU at the rate of exchange prevailing on 22 April 1998.

The main conclusions drawn from looking at prices by weight band and the differential between ordinary mail and direct mail are as follows:

- There are notable variations by country as well as by weight band in the price discounts for direct mail. Some countries in some weight bands have almost no differential, others up to 50-60% in the lower weight bands and 70-80% in the higher weight bands, with the rest in between.
- In several Member States it is hard to reconcile observed direct mail discounts with the allocation of costs among stages in the value chain in such a way as to respect the principle, inherent in the idea of a single universal price, that discounts should match cost savings.

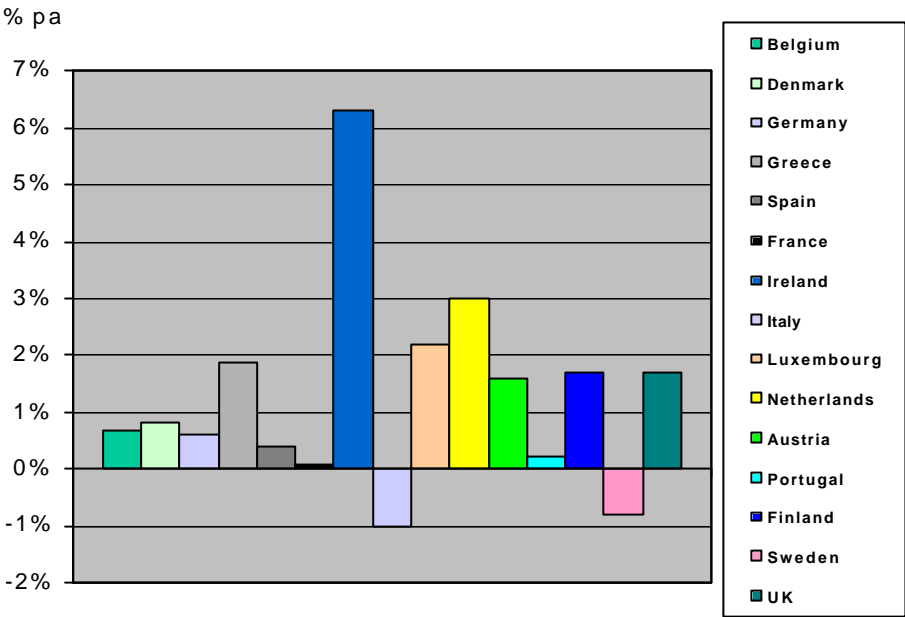
The model assumes that liberalising a weight band includes liberalising direct mail in that weight band. Thus the competitive position (and price) in the direct mail segment of that weight band after liberalisation will follow the direct mail liberalisation scenario rather than the weight-band liberalisation scenario.

5.6.2. Key quantifications

Underlying growth

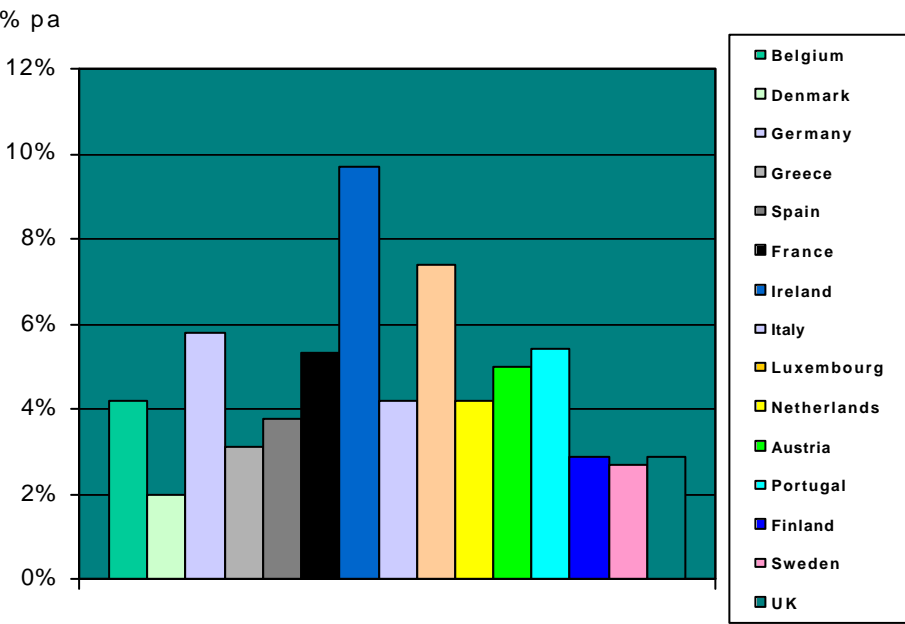
We have retained the Arthur Andersen version of the UPU model for projecting underlying growth in the direct mail market. We have used the same model, but with technology change as a negative factor, for ordinary mail. When these assumptions are fed through the model, an underlying growth rate for ordinary (non-direct) letter mail of between -1% and +2% is given for most countries, with the exception of Ireland at over 6% and the Netherlands at 3%.

Figure 1: Underlying growth 1997-2007, ordinary mail



Growth rates for direct mail are significantly higher than those for ordinary mail, from 2% for Denmark to over 9% for Ireland and over 7% for Luxembourg.

Figure 2: Underlying growth 1997-2007, direct mail



Price sensitivity

The Arthur Andersen study on direct mail gives a price elasticity of -0.8. We have taken this as an average figure. The Arthur Andersen study does not identify separate elasticities for the market as a whole and for individual players. In a competitive environment direct mail customers will become more price sensitive, particularly in the case of new entrants with low market shares.

The price sensitivity assumed by the model for direct mail varies with market share, from a low of -0.6 to a high of -5.0. That is, the market price elasticity, which is also the price elasticity faced by the universal service provider if it has a monopoly, is taken as -0.6. A private operator entering a competitive market with a very small market share is taken as facing a price elasticity of -5. There is a curve between the two, linking elasticity to market share. This is consistent with the scenarios presented in the Arthur Andersen report.

The model adopts a similar approach to ordinary mail, but assumes a lesser price sensitivity, of between -0.4 (for the market as a whole) and -3.5 (for a player with a very small market share).

Price elasticities of this order were regarded as reasonable by the participants in the workshop MMD held in June 1998.

Quality sensitivity

A key assumption for the model taken from the Arthur Andersen direct mail study is that the elasticity of demand with respect to quality is -0.4. The model adopts a similar approach here as the one described above in relation to price elasticity. Elasticity is taken to vary according to market share, with lower quality elasticity for ordinary mail than for direct mail.

Key entry strategies

The sector studies predict the market share which competitors will obtain of different streams of mail under different liberalisation scenarios and conditions. The model builds these market shares from a number of different elements. These include the price and quality elasticities described above, and any information the sector studies provide on entrant quality or price.

The model also assumes that a new entrant would obtain some market share when offering a price and quality comparable to that which already exists. This may be thought of as a lower quality, lower price offer, or an offer of comparable price which is better on some quality dimensions but worse on others. The model uses different individual shares for different Member States, consistent with the different results predicted by the sector studies. It is unlikely that such shares would be obtained at once. The model spreads them over 5 years, which is consistent with comments in some of the sector studies. Finally, the model uses different underlying growth rates for the business of new entrants, to reflect different growth from the average in the segments they attack.

The model combines these factors in such a way that the data and assumptions used in each of the sector studies generate through the model the outcomes predicted in that study. The model does this on a consistent set of assumptions, not all readily apparent in the sector studies, about how entry into postal markets works.

5.7. Efficiency gains

There is a widespread expectation that liberalisation of the market will stimulate universal service providers to become more efficient. Some evidence is adduced in the CTcon weight-band study to suggest that countries which have in the past liberalised their postal services have seen such a stimulus in action. However, the sector studies do not provide clear guidance on what sort of efficiency gains might be expected in which circumstances. In order to represent this effect in the model, we have had to make simplifying assumptions about how it might work and what it might be.

The efficiency factor in the model is directly related to the proportion of total mail that is liberalised. On the scale of the effect, we have again made a simple, transparent assumption, namely that there is a step change in efficiency resulting from full liberalisation of 5%: that is it costs the universal service provider 5% less to carry each item of mail from the year in which the market is fully liberalised. Partial liberalisation has a smaller effect in the model, depending on the proportion of mail liberalised relative to total mail.

Once again, we make no claim that this is the scale of the effect that will be observed, or that it is in fact linked to the degree of liberalisation in this way. We seek merely to represent an effect which several operators consider important in a way which is consistent, transparent and simple.

5.8. Employment

The model provides a rough estimate of the impact on employment of any liberalisation scenario which is run through it. This is not a subject that the sector studies cover in detail. We have taken the figure for the number of people employed in postal services in the universal service providers in each Member State from the 1997 Price Waterhouse employment study.

That study also gives, for some Member States and the European Community as a whole, estimates of the number of people employed in competing operators in the postal services market. The difficulty about these estimates from the point of view of this model is that the people concerned are not in general working on the streams of postal business with which this study deals. There are a few exceptions in those Member States that have already wholly or partially liberalised their postal markets. But in general, employees of private operators at present tend to be working on parcel or express services.

We could attribute the modest amounts of letter mail now carried by competitors, as calculated in the sector studies, to the staff estimated by Price Waterhouse to be working in competing postal operators. But if we do, it looks as if they handle far fewer letters per member of staff than the universal service providers. That does not seem a sensible basis on which to project postal employment. It implies that extra business for competing operators will, item for item, generate more employment than universal service providers lose when they lose the volume concerned. That is not the general expectation. On the contrary, the general expectation is that competing operators will use labour more productively than universal service providers will.

So what the model does is to start from the numbers Price Waterhouse give as employed in the universal service providers in each Member State. To arrive at our base year of 1997, we have

interpolated figures, in a straight line, between the Price Waterhouse base-case figures for 1995 and 2000.

The model then makes three assumptions. The first is that universal service providers become steadily more productive in their use of labour, so that the same volume of mail requires fewer people to handle it each year. The productivity growth assumed is 2% a year, which is consistent with the UPU forecast quoted in the Price Waterhouse study. This productivity gain occurs whether or not there is any further liberalisation of postal markets.

The second assumption is that the private operators are 10% more productive than the universal service providers. Thus, for any given volume of mail in any given year, competitors in a given Member State employ 10% fewer people than the universal service provider. Across the European Union, this implies substantial differences in the productivity of competing operators, because in each Member State their productivity is defined in the model by reference only to the productivity of the universal service provider in that Member State. This means that the model cannot sensibly be used to look at aggregate, EU-wide productivity.

The third assumption is that the efficiency gains described above are reflected in the use of labour by the universal service providers. That is, from the year of full liberalisation the universal service provider is assumed to use 5% fewer staff for a given volume of mail carried; while partial liberalisation produces a smaller reduction.

There are cases where individual universal service providers have planned or implemented improvements in productivity which go beyond those assumed here. Deutsche Post AG, for example, employed fewer people in 1998 than the Price Waterhouse study forecast for 2000. As no consistent set of up-to-date information on employment levels or plans is available from the sector studies, the model does not take such individual variations into account.

These are, of course, major simplifying assumptions. The model does not purport to provide detailed or authoritative forecasts of employment in the sector. Instead, it seeks again to provide a simple, transparent and consistent way of suggesting the comparative order of magnitude of the employment effects of different liberalisation scenarios.

5.9. Costs

In a rather similar way, the model provides a rough, first approximation of the cost and profit implications for universal service providers of different possible types and timing of postal liberalisation.

The starting point for this part of the model has been the NERA study mentioned above on the cost of the universal service. NERA give distribution cost curves for five Member States: France, Ireland, Austria, Finland and the UK. These represent a plot of price per item against volume distributed. As individual flows are not generally costed, NERA have used as the points on their curves the average cost per item going through a particular distribution office. The volume of mail is ranked by distribution office into cost order, with the cheapest to distribute shown nearest to the origin. We have disregarded a sixth graph, for Portugal, because it is not in terms of cost but of “equivalent number of postmen required to deliver one letter”.

Except in the case of the UK, we have had to estimate the figures from the graphs in Annex 3 to the NERA report. This has not been easy because the important part of the graph generally lies in a small area on the page. In the case of France, the NERA study contains two graphs: we have averaged the estimated numbers from the two.

Annex 1 shows our attempts to reproduce the NERA graphs from these estimates, which may be compared with the graphs in the NERA report. This annex also explains how we have used these figures to arrive at a set of assumptions about the cost of distributing different volumes of mail in different Member States. This is a different approach from that adopted in the CTcon studies, which simply assume that 80% of distribution costs are fixed, while 20% vary directly with volume.

We have then taken from the CTcon access study (rather than the NERA study on grounds of consistency with the data used in the rest of the model) the proportion of the costs of the universal service provider in each country which are

- a) non-operational
- b) operational excluding delivery
- c) attributable to delivery.

The model assumes that non-operational costs do not vary with volume changes. Operational costs excluding delivery are assumed to vary directly with collection volume. That is, a loss of 10% of collection volume is assumed to imply a reduction of 10% in collection costs (as well as a loss of 10% of collection revenue). CTcon suggest that a proportion of collection costs is fixed, in relation to collection from the premises of business customers. We have not followed them on this point, because the model only deals with changes from one year to the next. On the timescale of a year, it seems likely that all collection costs are variable with the volume to be collected. The model also takes sorting costs as variable. The CTcon study offers different views on this point. The model presented here is consistent with the discussion of sorting costs in the CTcon network access report, which concludes that they are all variable: “the argument of economies of scale within the process of sorting is rather of no importance” (Network Access study, page 18). In this the model differs from the statements elsewhere in the CTcon studies (Network Access study, page 59, and Weight-Band study, page 42) that in the case of automated sorting equipment, only half the change in volume is reflected in a change in cost. The CTcon profit calculations take half of automated sorting costs to be fixed.

The crucial assumption is that competitors take first the cheapest mail to deliver. Thus a loss of 10% delivery volume loses the universal service provider 10% of delivery revenue, but only saves it that cost which is represented as the area below the distribution cost curve from 0% to 10% volume.

Total costs for each Member State are estimated (following CTcon) by taking postal revenues for 1997 and subtracting the margin for the total business of the universal service provider. The assumption here is that the margin on postal business which is the concern of this study is the same as the overall margin on the universal service provider’s business as reported in its annual accounts. We (like CTcon) make that assumption because universal service providers do not publish, even when they know, the separate profitability of their letter mail business.

It will be clear from the above that the results of this exercise can only be considered very rough approximations, pending disclosure of more detailed cost information. The main aim of the cost model is to compare the relative impacts of various scenarios. Thus the focus is more on differences in percentage than on absolute values.

The resulting profit projections differ from those of CTcon for a number of reasons. The main one is that in their profit calculations, CTcon treat volume gained and volume lost as exactly equivalent in terms of delivery costs. The MMD model assumes that volume gained from underlying growth has average costs of delivery, but volume lost to competitors has the lowest costs of delivery. Secondly, the model uses the price changes resulting from direct mail liberalisation shown in the Arthur Andersen direct mail study, which are different from the price changes for direct mail assumed by CTcon. In addition, as noted above, there are more elements of fixed cost in the CTcon profit model. The result is that underlying growth is only of average profitability in the model presented here, whereas it is extremely profitable in the CTcon profit model. Thus underlying growth goes less far in this model than in the CTcon study to compensate for business lost as a result of liberalisation.

6. THE MODEL

6.1. Overview

The model provides a means of estimating the effects of liberalisation scenarios and associated competitor responses in Member States on the volumes and revenues of postal flows, both for the universal service providers and for new market entrants.

The model uses data on current postal volumes and prices, together with estimates of price and quality elasticities, to prepare annual projections over a ten-year period. Details of the model structure are given below.

6.2. Structure of the model

As with any model, the structure of this model reflects the need to achieve a satisfactory compromise between a number of conflicting factors, including the following:

- An accurate and detailed representation of the system being modelled;
- A simple and straightforward interface with the user, so that the model is “user-friendly”;
- A computationally viable system, so that the model is capable of running within a reasonable period of time on a readily-available specification of personal computer;
- The flexibility to cover the range of scenarios of interest;
- The availability of data for use in the model.

In order to achieve a balance between the above factors, the following design parameters have been adopted for the current version of the model.

6.2.1. Cases

For each of the 15 Member States, the model breaks down the postal flows into three types of mail. Because the primary purpose of the model is to enable the impacts of various postal liberalisation scenarios to be investigated, the types of mail are defined to correspond with the expected form of postal system liberalisation decisions, and are:

- domestic letter mail not classified as direct mail (“ordinary mail”)
- direct mail
- cross-border mail.

In addition, each type of mail is further sub-divided into 9 weight bands.

For computational purposes, each weight band within each type of mail is simulated in the model as a separate case. For each Member State, the model therefore considers 27 (9 times 3) separate cases, and for the European Union as a whole, the model considers 405 (15 times 27) separate cases.

6.2.2. Market segments

Elasticity of postal demand with respect to the price and quality of service offered by postal operators may actually in the market vary between segments within each of these cases. For example, domestic letter mail flows between businesses and households may be more (or less) responsive to price or a particular quality parameter than mail flows between households and other households, or mail which attracts volume discounts may be more or less responsive than single-item mail.

The sector studies have not identified differences in elasticities for different segments of that kind. They have identified different segments as more or less likely to attract the attention of competitors, and they have identified in which of these segments they expect competitor market shares to be won. Differences between business and private mail, or urban and rural mail, are not affected by liberalisation, in the sense that liberalisation decisions will cover all of them. That is, it is difficult to see how business to business mail, say, can be liberalised without household to household mail being liberalised too. The model takes account of the sector study findings on the attractiveness of different segments by applying appropriate percentages to the overall volume of letter mail in the weight band and type of mail (direct, ordinary, cross-border) concerned.

6.2.3. Competitors

The model considers three types of competitor to the universal service provider. These are:

- the full-service (“FS”) provider, who collects mail from originators (or in the case of cross-border inward mail, from the frontier), and performs all relevant steps in the value chain up to

and including delivery to the recipient (or, in the case of cross-border outward mail, to the border);

- the upstream access (“USA”) provider, who collects mail from originators (or in the case of cross-border inward mail, from the frontier) and hands it in to the universal service provider at its outward sorting offices (or bulk pre-sorted mail collection points, if those are different), taking advantage of network access liberalisation to have the universal service provider take it on from there to the recipient (or, in the case of cross-border outward mail, to the border);
- the downstream access (“DSA”) provider, who collects mail from originators (or in the case of cross-border inward mail, from the frontier), carries out outward sorting and transport, and takes advantage of network access liberalisation to hand it to the universal service provider for inward sorting and delivery.

The key assumptions here are that all forms of liberalisation other than network access require other players to provide a full service from end to end, and that the value chain for the purposes of network access does not have as many steps as in theory it might. The model assumes that access only to the universal service provider’s transport facilities is not realistic. In practice, upstream access would only be to the outward sorting office (or bulk pre-sorted collection point, if different). The model also assumes that access to the delivery facility on its own is unrealistic, involving an individual postman collecting mail for the delivery round from different distribution offices, so that downstream access in practice means access at the inward sorting office. The CTcon study expresses doubt about the practicality of separating inward sorting from distribution (Network Access study, page 31). It does not, however, discuss upstream access in the sense used here, and generally treats access in a liberalised market as access only to the distribution service of the universal service provider.

The types of competitor described are functions and not individual companies. One individual company may operate as more than one type of competitor. It may, for example, collect mail from its customers and deliver some of that mail itself to the recipients, but (following liberalisation of network access) also pass some of the mail back to the universal service provider for delivery. In the terms of the model, it will then be acting as a Full Service competitor for some of the items it handles, and as a Downstream Access competitor for other items. Within each of these classes of competitor, there are of course likely in practice to be several individual companies competing. The individual competitors are not modelled separately.

It is clear, and made clear in all the sector studies, that an important category of competitor in a liberalised postal market is likely to be the universal service providers from other Member States. We have not treated that as a separate category of competitor in the model. A universal service provider from one Member State operating in another Member State after liberalisation may operate there as a full-service provider or an upstream or downstream access provider.

All universal service providers have sources of income which are outside the “reservable” area of postal services which is the subject of this study. These include types of postal service which are not, in the terms of the Directive, reservable to the universal service provider, and in many cases non-postal services as well, such as money transmission or telephony. In reporting the results of the effect of liberalisation on postal markets, the model confines itself to the effect on the reservable

business of universal service providers. The overall finances and employment levels in the organizations which provide the universal service after liberalisation will of course also be affected by their performance in other fields, including their success in competing in other Member States in liberalised parts of the postal services market.

6.2.4. Boundaries

The model can be used for any single Member State, or for the European Union as a whole. Reports on scenario results for individual Member States show a comparison between the results for that Member State and for the whole EU.

When the model is used to run a simulation for a Member State, each of the 27 separate cases considered by the model is defined in terms of the boundaries of the Member State.

Thus:

- Cross-border inward mail originates at the state border. We may think of foreign postal operators bringing the mail they have collected from their residents for recipients in the Member State in question to its border, and considering how best to convey it to the recipients. Price, quality of service and revenues treated in the model are from the frontier onwards to the recipient;
- similarly, cross-border outward mail terminates at the state border - and the prices and revenues refer to the postal flows up to this point.

The model follows the PricewaterhouseCoopers cross-border study in dealing with postal flows inside the European Union, and disregarding postal traffic with the rest of the world. Thus no effect on that traffic arising from liberalisation is captured in the model. As noted above, we have no data from the PricewaterhouseCoopers study on the origin or destination of cross-border mail. Even if that became available, it is not obvious that the considerable extra complexity of covering the mail flows with the rest of the world would be justified by the significance of such information to the liberalisation decisions.

6.2.5. Quality

A number of different quality factors matter in postal services, such as speed, reliability, security, ease of access. The key assumption made in the model, as in the sector studies, is that it is possible to combine different quality factors into a single index. Although this level of aggregation is a simplification of how the postal market behaves, neither MMD nor the postal operators with whom we have discussed it see an alternative way of representing quality in the model, or of obtaining supporting data.

6.3. Description of the sub-models

6.3.1. Introduction

The model carries out the calculations through a series of linked sub-models, each covering a particular aspect. We describe the different sub-models below, and then summarize the way the model is implemented.

6.3.2. The liberalisation sub-model

The liberalisation sub-model takes the user inputs on liberalisation dates, and performs two calculations:

- If a low weight band has been liberalised when higher weight bands have not previously been explicitly liberalised, then all higher weight bands are automatically liberalised as well.
- Any liberalisation of weight bands applies to all types of mail considered by the model (ordinary mail, direct mail and cross-border mail) for the weight bands specified, irrespective of other liberalisation decisions.

6.3.3. Price and quality sub-model

Price and quality are combined to form an “effective price” for the market competition model. The calculation of the effective price is carried out so as to be equivalent to operating the market competition model with separate price and quality parameters and elasticities. Implementation of the model is, however, simpler and more efficient with a combined factor, the effective price, than with separate price and quality parameters and elasticities.

In the absence of information to the contrary, the model assumes a constant ratio between the price elasticity and the quality elasticity.

6.3.4. Self elasticity sub-model

The self-elasticities contained as internal data in the model apply to a specified effective price and market share. If the self-elasticities were assumed to remain constant as the effective price and market share changed, then anomalous results would be obtained. The self-elasticity sub-model provides estimates of how these elasticities change with changes in the market (that is, changes in the effective price and market share for each active competitor).

6.3.5. Cross price elasticity sub-model

Cross price elasticities for each "case" are estimated from the self-elasticities, the market elasticity, the volume shares and the revenue shares. The estimates are based on an analysis of the behaviour of markets across a broad range of sectors.

6.3.6. The market entry sub-model

The internal data on initial market shares for a new market entrant correspond to a price and quality offering equivalent to that of the average for the market at the time of entry (in practice, this will generally be that of the universal service provider).

The sub-model then adjusts these initial market shares, taking into account the actual price and quality offering (the effective price) for the new market entrants. This adjustment is made using the self-elasticity relevant to the new entrant. The calculation is iterative.

Having determined the new entrant market share as described above, the market shares of the existing competitors are adjusted accordingly.

6.3.7. The market competition sub-model

The market competition sub-model uses the year-on-year change in the effective price, together with the internal data held on underlying growth rates, in order to calculate the year-on-year change in the volume.

For each type of competitor (Universal Service Provider, Full Service competitor, Upstream Access competitor, and Downstream Access competitor), the year-on-year change in volume depends not only on the effective price of the competitor, but also on the effective prices for the other participants in the market.

The relationships between the volume changes and the changes in the effective price are determined by the self-elasticities and the cross elasticities (see above).

As noted earlier, the market competition model operates for each "case" considered by the model, comprising nine weight bands in each of three types of mail for each country under consideration.

Finally, the year-on-year volume changes are converted to actual volumes for each of the years considered by the model.

6.3.8. The market leakage sub-model

The initial estimates of the volumes obtained from the market competition model are corrected for "market leakage" effects as discussed above and summarized below.

On downstream access liberalisation, a proportion of the market is transferred from:

- The Full Service competitor (ordinary mail) to the Downstream Access competitor (ordinary mail)
- The Full Service competitor (direct mail) to the Downstream Access competitor (direct mail)
- The Full Service competitor (cross border inward mail) to the Downstream Access competitor (cross border inward mail)

On cross border liberalisation (if this occurs before weight band liberalisation), a proportion of the market is transferred from:

- The Universal Service provider (ordinary mail) to the Full Service competitor (cross border inward mail)
- The Universal Service Provider (direct mail) to the Full Service competitor (cross border inward mail)

On partial liberalisation by weight band, a proportion of the market is transferred from:

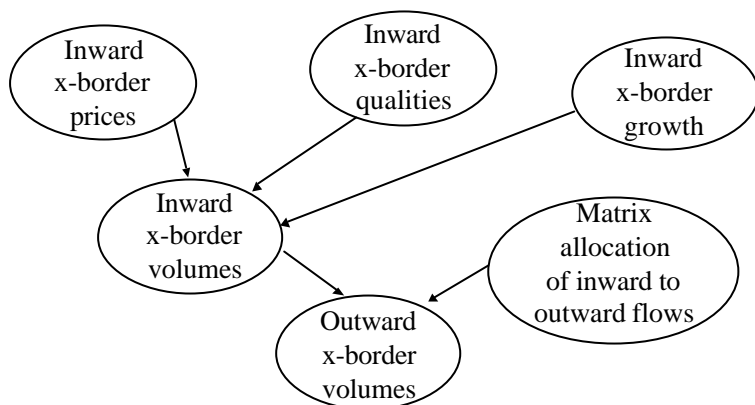
- The Universal Service Provider (ordinary mail) to the Full Service competitor (ordinary mail)
- The Universal Service Provider (direct mail) to the Full Service competitor (direct mail).

6.3.9. The cross border outward mail sub-model

This model estimates the volume of cross border outward intra-EU mail from the cross border inward intra-EU flows calculated from the market competition model, by mapping the inward flows to the Member States of origin.

The proportions used in this mapping are assumed not to vary with time and, in the absence of other information, have been set (as noted above) in proportion to internal ordinary mail and direct mail volumes. Thus:

Figure 3: cross-border model



6.3.10. The revenue sub-model

The volumes obtained as outputs from the above models are used in the revenue sub-model, together with base-year prices with any changes over time specified (in real terms) by the user, to provide initial estimates of revenues. These estimates are provided for each weight band and type of mail, and for each country under consideration.

If network access has been liberalised, the initial revenue estimates are then corrected to take into account the access charges assumed to be paid by the Upstream Access competitor and the Downstream Access competitor to the Universal Service Provider.

6.3.11. The cost sub-model

The cost sub-model breaks down costs into three main components:

- Non-operational costs
- Non-delivery operational costs
- Delivery costs.

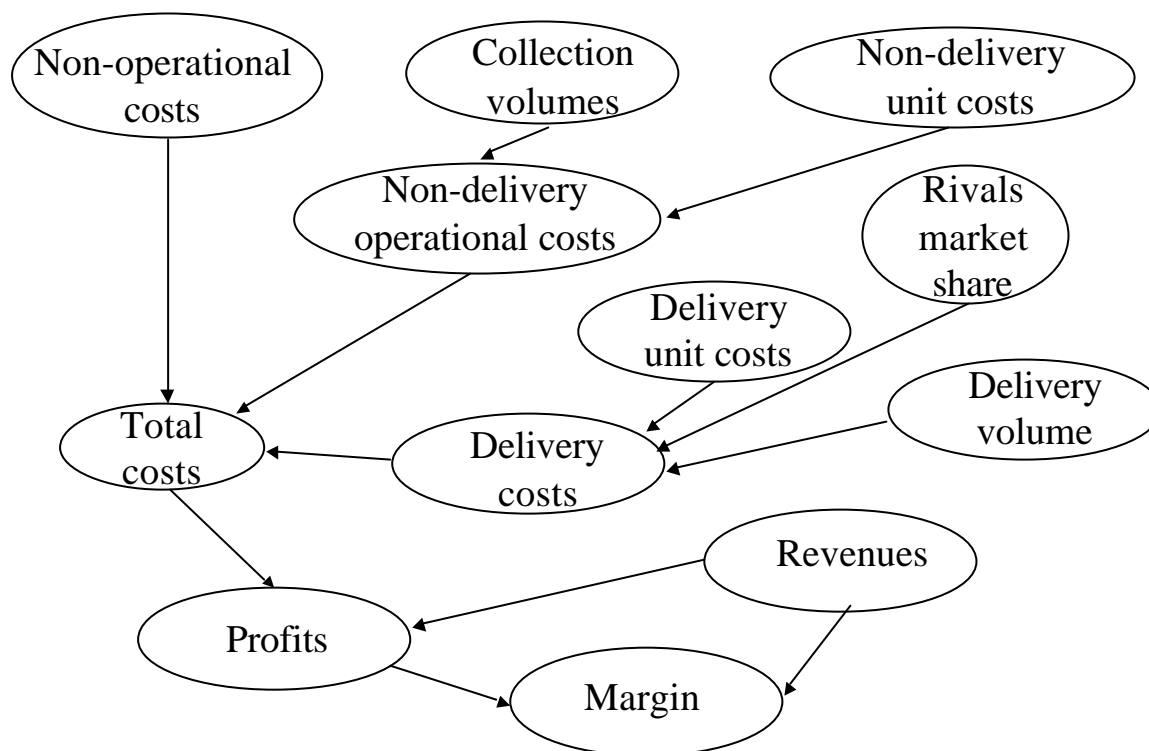
Data for the initial values (for 1997) of each of these cost components are stored in the model.

Non-delivery operational costs are assumed to be proportional to volumes, taking into account separately the volumes for ordinary mail, direct mail, cross border inward mail, and cross border outward mail.

The delivery cost model is based, as discussed above, on estimated marginal delivery cost curves for each country. It is assumed that competitors preferentially target those sectors of the market with the lowest delivery costs, leaving the universal service provider with those sectors of the market with the highest delivery costs.

The total costs for the universal service provider calculated from the above cost components are then modified to take into account the increases in efficiency that are expected to arise from increased exposure to competition.

Figure 4: cost model



6.3.12. The profits and margins sub-model

The year-by-year profits for the universal service provider from reservable services in its home Member State are calculated from the revenues and costs.

The margin on sales is then calculated from the profit and sales revenue.

The main purpose of this sub-model is to compare the relative impacts of several scenarios, so the focus is more on differences in margin than on absolute values.

6.3.13. The employment sub-model

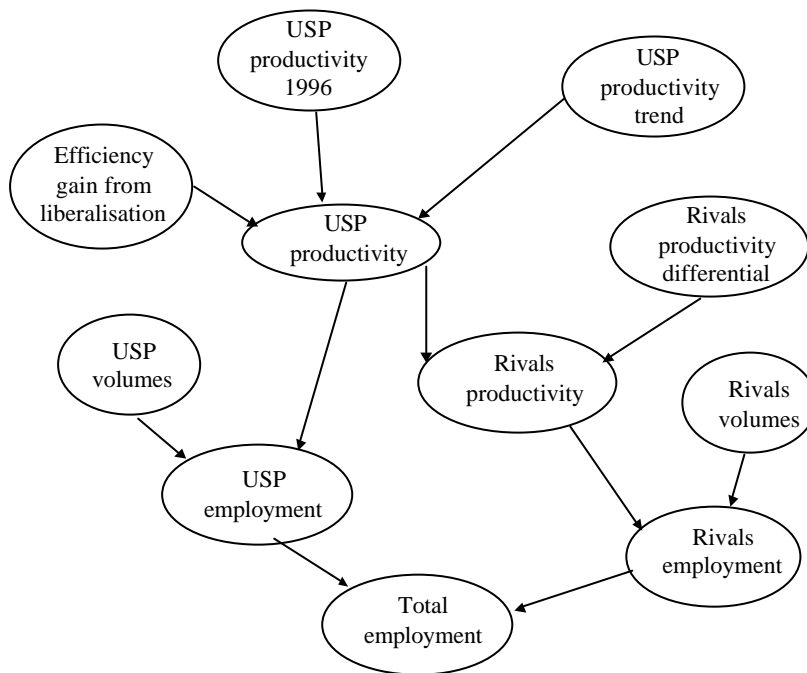
For the universal service provider, employment is calculated on the basis of the initial (1997) employment data, assuming:

- Employment is proportional to the total volume of mail carried
- Year-on-year improvements in productivity occur, as specified by the internal data

- Liberalisation produces a step-change in efficiency.

For the competitors to the Full Service provider, the model is similar except that the calculation is based on a productivity differential with the Full Service provider. Thus:

Figure 5: Employment model



6.4. Macro shell

6.4.1. Summary

The overall model is implemented within a macro “shell”, the purpose of which is to provide a user-friendly interface for:

- entering data on the liberalisation scenario of interest - and related assumptions
- seeing the results of the model in tabular and graphical form.

The macro shell is described in Annex 2, below.

6.5. The intermediating layer

6.5.1. Summary

The intermediating layer provides the interfaces between the user input screens, the engine, and the user output data screens. Specifically, this layer performs four functions:

- Processing and storing the user input data in a form that is accessible efficiently by the engine;
- Storing embedded data (that is, data that will not be changed as a result of user inputs), again in a form that is accessible efficiently by the engine;
- “Managing” the engine; it specifies the cases to be considered by the engine and collects the results of the computations carried by the engine for each case;
- Performing further calculations on the results generated by the engine so that the macro shell can present output information to the user in a variety of forms.

6.5.2. Processing and storing user input

The functions undertaken by this part of the intermediating layer comprise:

- The liberalisation sub-model
- The price and quality sub-model.

6.5.3. Storing internal data

The internal data stored in the intermediating layer are summarized below:

- Volumes in 1997
- Qualities in 1997
- Prices in 1998
- Default liberalisation years
- Market elasticities and reference prices
- Underlying growth
- Initial new entrant market shares available for offers equivalent to those of the universal service provider
- Access payments to the universal service provider
- Cross-border flows
- Cross-border outward prices
- Current liberalisation status
- Cost data

- Employment data
- Market leakage assumptions
- Efficiency gain assumptions.

6.5.4. Managing the engine

The intermediating layer “manages” the engine, using an Excel feature called a “data table”. For each country specified by the macro shell, the data table specifies the 27 cases to be evaluated by the engine, and captures the results as postal volumes.

6.5.5. Processing the results

The intermediating layer carries out the following processing of the results provided by the engine and captured by the data table:

- The market leakage sub-model
- The cross border outward mail sub-model
- The revenue sub-model
- The cost sub-model
- The profit and margins sub-model
- The employment sub-model.

6.6. The engine

The engine is the core of the model, as it contains the basic calculations for a market. The principal inputs are the year of the liberalisation, and the prices and qualities by year; the principal outputs are the postal volumes by competitor and year. It contains a number of sub-models, which are run for each case:

- The self price elasticity sub-model
- The cross price elasticity sub-model
- The market entry sub-model
- The market competition sub-model.

7. SCENARIO RESULTS

This section of the report presents the results of four scenarios (and one combination) that have been run through the model. These are:

Scenario 1: Reference scenario: Status Quo

- No further liberalisation of any markets
- Underlying growth in the markets as presented above
- No price or quality changes for ordinary mail or cross border mail
- Modest price changes for direct mail
- Modest quality improvements for direct mail.

Scenario 2: Liberalisation in 2003 of Direct mail and Weight bands >50g

- Full liberalisation of all direct mail, but of ordinary mail only in weight bands greater than 50g
- Underlying growth in the markets as described above
- Falls in price at the date of liberalisation averaging around 5% for Direct mail, and equivalent to around 1% across all weight bands for ordinary mail and cross border mail
- Accelerated improvements in quality in the direct mail markets in the run up to liberalisation.

Scenario 3: Liberalisation in 2003 of Direct Mail and Cross-border mail and Weight bands >50g

- As Scenario 2 with the addition of full Cross-border liberalisation, both inward and outward across all weight bands

Scenario 4: Full liberalisation in 2003 of Direct mail, Cross-border mail and Weight bands

- Full liberalisation of direct mail, ordinary mail in all weight bands and of cross-border mail, inward and outward
- No downstream or upstream access for third parties to the network of the universal service provider
- Underlying growth in the markets as described above
- Falls in price at the date of liberalisation averaging around 5% for Direct mail, and around 7-8% across all weight bands for ordinary mail and cross border mail
- Accelerated improvements in quality in the direct mail markets in the run up to liberalisation.

Combination of scenarios 3 and 4: Liberalisation in two stages, partial in 2003, full in 2005

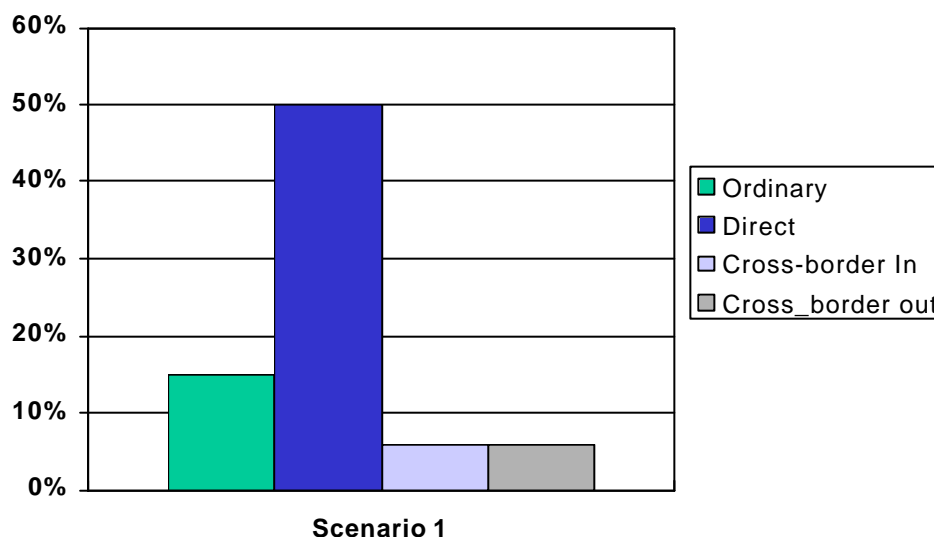
- As Scenario 3 for the years 2003 and 2004
- Then moving to the same as Scenario 4 after 2005.

7.1. Reference Scenario: the Status Quo

7.1.1. USP Volumes

Figure 6, below, shows the growth in the volumes of letter mail for each of the main mail flows between 1997 and 2007 carried by the Universal Service Providers under Scenario 1 (Status Quo).

Figure 6: USP letter volume growth, 1997 to 2007 (annual % change)

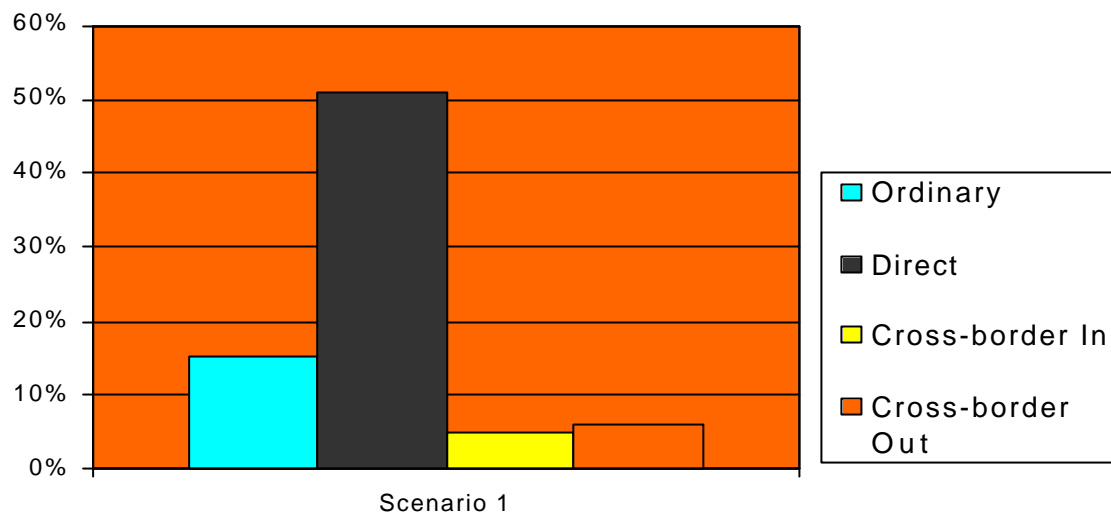


This graph shows that under the reference scenario, volumes of mail handled by the universal service providers (“USP”) in all Member States, taken together, grow significantly. Ordinary mail rises by around 15% in volume terms with direct mail recording a rise of 50% over the 10 years. Intra-EU cross-border mail volumes rise by a more modest 6%. The variations between the Member States in underlying growth rates are set out above (Figure 1, page 20).

7.1.2. USP Revenues

Figure 7, below, maps out the future for the USP in terms of revenue (in real terms), under Scenario 1. Since in broad terms under this scenario prices remain constant, the growth in revenues reflects the growth in volumes shown in Figure 6.

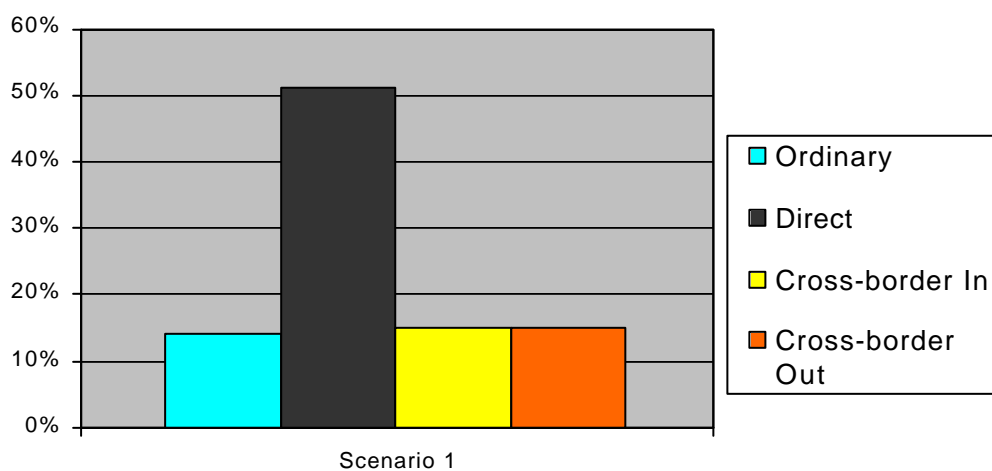
Figure 7: USP letter revenue growth, 1997 to 2007 (annual % change)



7.1.3. Total Market Volumes

Figure 8 shows the corresponding picture for the total market for volumes of mail. The total market grows slightly faster than the volume handled by the universal service providers, reflecting a marginal fall in the overall market share of the universal service providers.

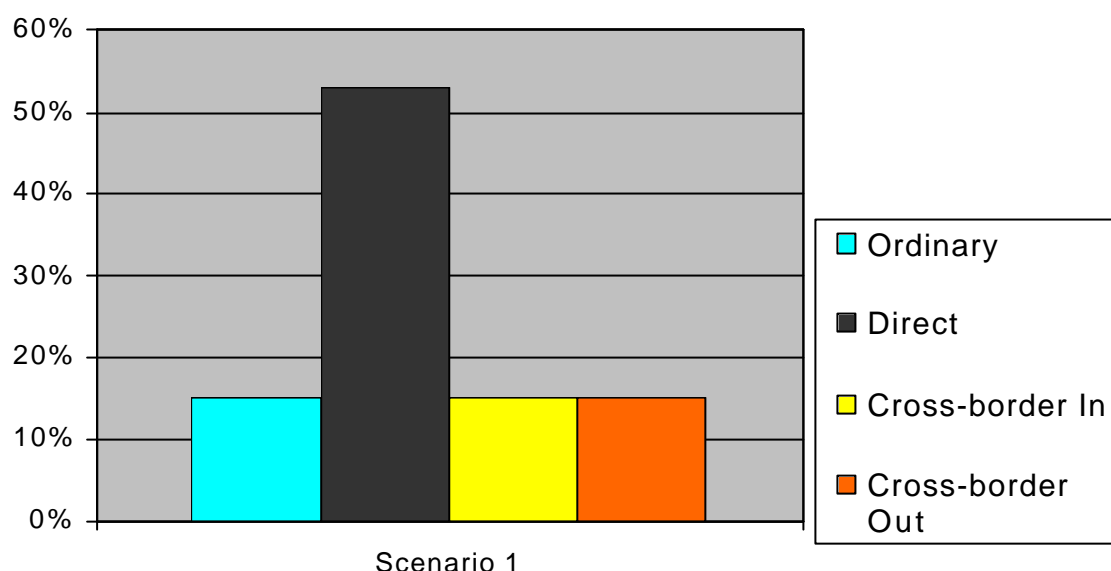
Figure 8: Total market letter volume growth, 1997 to 2007 (% change)



7.1.4. Total Market Revenues

Figure 9 shows the corresponding picture for the total market for revenues.

Figure 9: Total market letter revenue growth, 1997 to 2007 (% change)



7.1.5. Employment and profit margins

We also trace through the employment and profit implications of the growth in volumes and revenues implied by this scenario. Since the main purpose is to compare the relative impacts of various scenarios, the focus here is more on percentage differences than on absolute values. Some universal service providers are implementing programmes of restructuring which will reduce the number of people they employ for any given level of business. Once these efforts are complete, the assumptions used here mean that the model predicts overall postal sector employment to remain fairly static under this scenario over the period to 2007, with low volume growth more or less balancing further slow improvement in productivity.

This average result masks a wide range of outcomes in individual countries. Countries with high rates of growth of mail show strong growth in employment in their universal service provider, in several cases 10% or more over the period and in one case over 40%. At the other end of the scale, where postal growth is slow, and competition already present, employment both in the universal service provider and in the market as a whole declines, in several cases by 10-15% over the period.

The profits of the universal service providers (in real terms) more than double over the 10-year period for the EU as a whole under this scenario. Universal service providers in a few countries move from slight losses to very substantial profits, as volumes grow. Large, already profitable universal service providers become more so. The best result is a tripling of 1997 profits by 2008. On

the other hand, several countries slip back, in some cases from modest profits to modest losses, as competitive market shares inch upwards.

It is important to remember three points about the profit figures suggested by the model:

- They represent the small difference between two very large numbers: over the European Union as a whole, the universal service providers' margin in 1997 averaged 3%, so that a slight trend over 10 years can make what is proportionately a large difference to the profit figure
- They are derived from a series of assumptions, which are described above, as the universal service providers were prepared to make very little evidence on profitability available to the consultants who undertook the sector studies
- Focus within the model is on differences in percentages rather than on absolute values.

7.2. Full Liberalisation

7.2.1. USP Volumes

Figure 10: USP letter volume growth, 1997 to 2007 (annual % change)

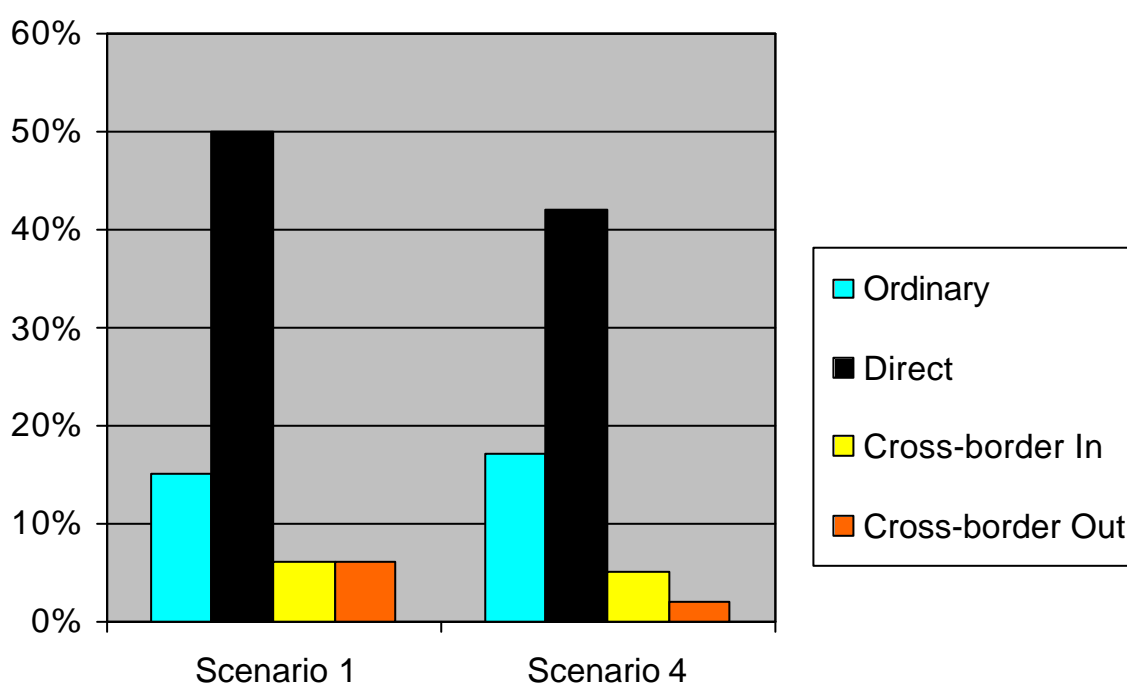


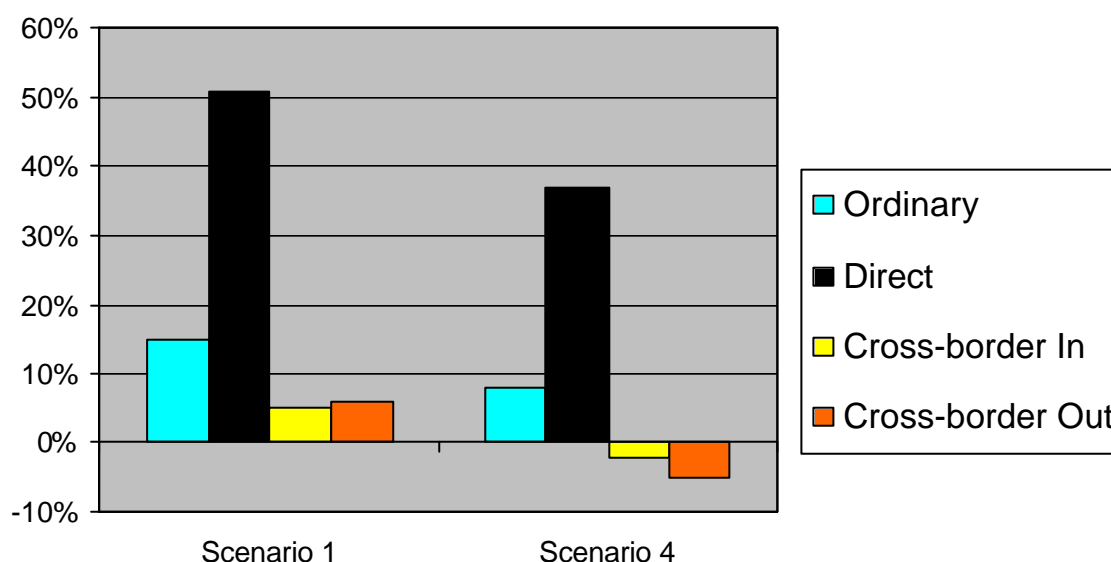
Figure 11 compares the results of running the model under the assumptions of Scenario 4 (Full liberalisation) with that of Scenario 1 (Status Quo) for the growth in letter volumes carried by universal service providers.

In fact, under full liberalisation, the volume of ordinary mail letters grows slightly faster than under the Status Quo scenario. This is because the universal service provider is assumed to respond to the threat of competition with significant price reductions, hence boosting the overall market. On the other hand, the growth in the volume of direct mail and cross-border mail carried by universal service providers is negatively affected by liberalisation. The direct mail market is more attractive to competitors than the ordinary domestic mail market. In these cases the loss of business by universal service providers to competitors exceeds their gain from market growth.

The scale of the increase in total letter volumes carried by universal service providers varies between the Member States, from a maximum of nearly 90% over the period to 2008 to a minimum of 2% (in a market that is already liberalised).

The full impact of the universal service providers' price response to the threat of competition is evident when we compare the revenue implications of liberalisation with the reference scenario.

Figure 11: USP letter revenue growth, 1997 to 2007 (annual % change)

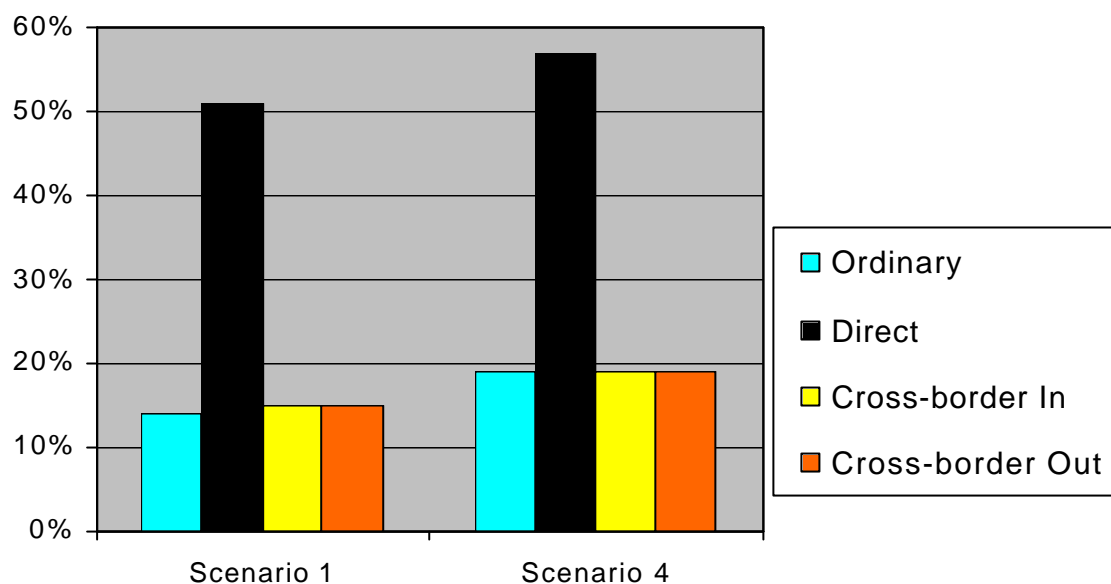


7.2.2. Total market

Figures 12 and 13 show that most of the growth in the total market comes in direct mail. Ordinary mail revenues still grow in all except four Member States, but considerably more slowly than volumes. Only three Member States show revenue growth of more than an average of 1% a year for ordinary mail under full liberalisation.

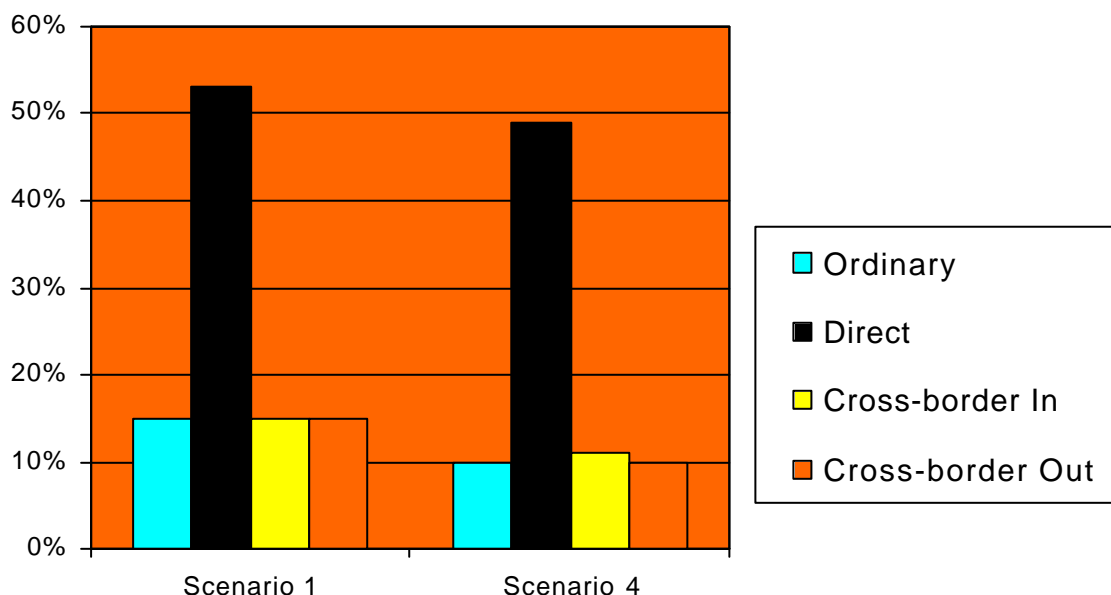
Cross border mail carried by universal service providers shows marginal rises in volume under full liberalisation, but falls in revenue in several Member States. The range here is from –5% to +6% for inward cross-border revenue, and from –9% to +6% for outward cross-border revenue.

Figure 12: Total market letter volume growth, 1997 to 2007 (% change)



Under the Full Liberalisation scenario, total market revenues fall slightly as lower prices outweigh the impact of higher volumes. This is particularly noticeable in the direct mail market.

Figure 13: Total market letter revenue growth, 1997 to 2007 (% change)



7.2.3. Employment

The Price Waterhouse study on employment in postal services, cited above, looked at trends in a particular regulatory framework, and focussed on a number of factors influencing employment in postal services, other than the degree of liberalisation, such as changing technology and technical

substitution. In our model, we have focussed only on the effects of different kinds of liberalisation on employment.

The model suggests that employment in universal service providers in 2007 would be 5% less under full liberalisation (Scenario 4), than under the regulatory status quo (Scenario 1). As noted elsewhere, the change in employment in universal service providers considered here is the change in employment on reservable postal services in the home Member State of the universal service provider concerned. The loss of market share by any given universal service provider may in practice, to a significant extent, be a gain for the universal service providers from other Member States. If so, then of course the aggregate change in employment in universal service providers across the European Union will be closer to the model's prediction for employment in the total postal services market. That is, that total employment will be only 0.6% less under full liberalisation (Scenario 4) than under the status quo (Scenario 1).

There is again here a range between Member States. Where postal markets are already wholly liberalised, there is no further liberalisation effect on employment. Elsewhere, the universal service providers show up to 6% fewer jobs under full liberalisation (Scenario 4) than under the regulatory status quo (Scenario 1), without taking account of any success they may have in each others' markets after liberalisation. In terms of total employment in reservable postal services, the picture in several Member States is, overall, unchanged as between the two scenarios. In four Member States full liberalisation provides more jobs (around 1%), and in six less (1%-3%).

7.2.4. Margins

Across the European Union as a whole, the margins of universal service providers average 3% in 1997, the base year for the model. This average margin is predicted to grow to 4% by 2002 and to 5% by 2007, under the reference scenario with no further liberalisation. This average conceals a wide range of individual performances. Four universal service providers were making losses in the base year, of up to -17%, and are predicted still to be losing money in 2007 on the assumptions used here.

Under full liberalisation in 2003 the average margin calculated by the model falls, from 4% in 2002 to 1% in 2003, a level from which it only very gradually recovers over the succeeding five years. The impact is quite dramatic in the year of liberalisation as the result of the combined effect of lower prices and loss of volume.

Clearly, those countries that already have fully liberalised postal markets do not suffer these effects. Among affected Member States, most show margins falling in 2003, by up to six percentage points (from a profit margin of 2% to a loss margin of 4%). Universal service providers in seven Member States are shown as making losses under the full liberalisation scenario, negative margins ranging from -1% to -12%, while in eight Member States they are in profit, with positive margins between 2% and 25%.

As with employment figures, it is important to remember that the model deals only with the reservable business of each universal service provider in its own Member State. So far as universal service providers benefit from the liberalisation of postal services in other Member States, the aggregate position of EU universal service providers will be better than shown here. It is also

important to remember the caveats about the profit calculations in the model which are described above.

7.3. Partial Liberalisation

Scenarios 2 and 3 capture the impact of different degrees of liberalisation. The main difference between the two new scenarios is that Scenario 3 incorporates liberalisation of cross-border mail items weighing less than 50g.

Figures 14-17 trace through the volume and revenue impacts of Scenarios 2 and 3 and compare them with the previous scenarios. Figure 18 looks at the employment effects. The most dramatic impact is seen in Figures 16 and 17 in respect of total market cross-border mail under Scenario 3. The reason for this is the assumption, discussed above and taken from the PricewaterhouseCoopers study on cross-border mail, that liberalisation of cross-border mail ahead of domestic mail will induce a significant shift of what used to be domestic mail into cross-border mail. Because cross-border mail is at present so small a proportion of total mail flows (in all but two of the Member States), even a small proportion of domestic mail becoming cross-border mail makes a large difference to the amount of cross-border mail.

Figure 14: USP letter volume growth, 1997 to 2007 (% change)

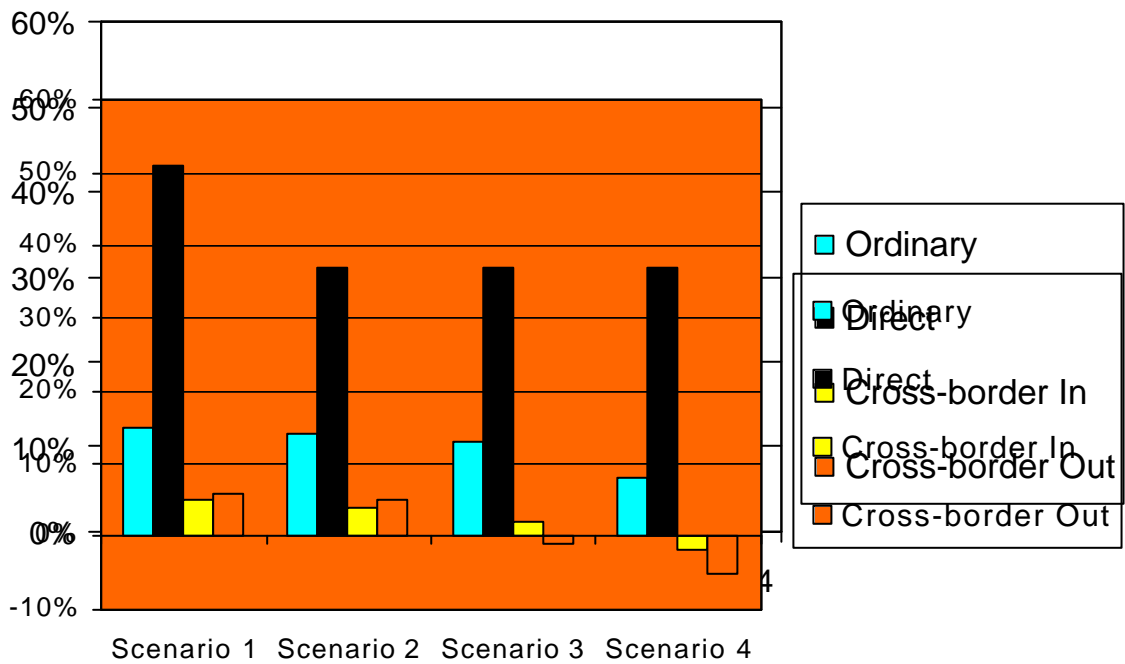


Figure 15: USP letter revenue growth, 1997 to 2007 (% change)

Figure 16: Total market letter volume growth, 1997 to 2007 (% change)

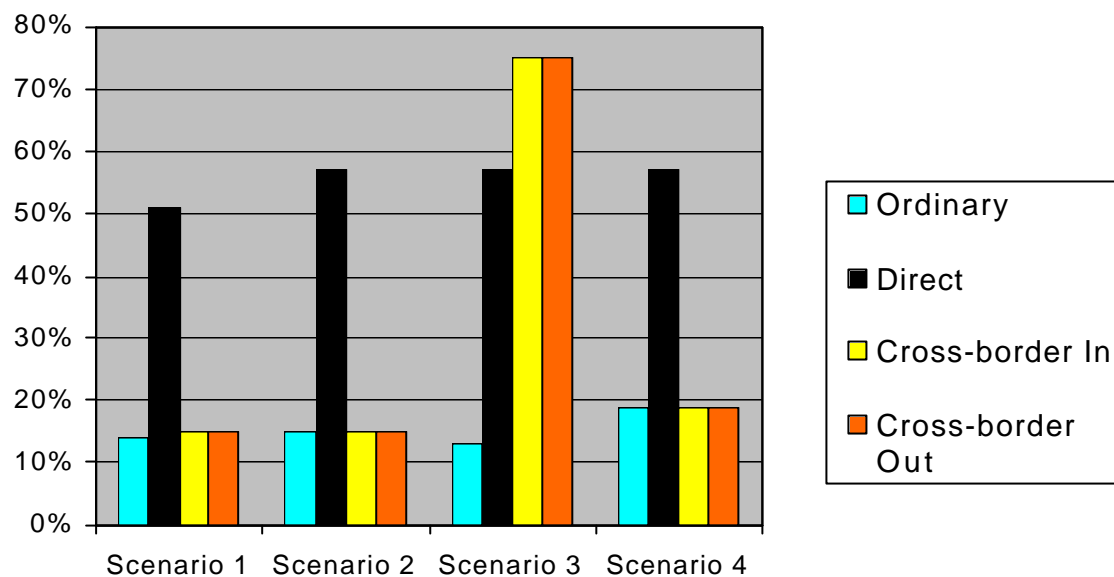


Figure 17: Total market revenue growth, 1997 to 2007 (% change)

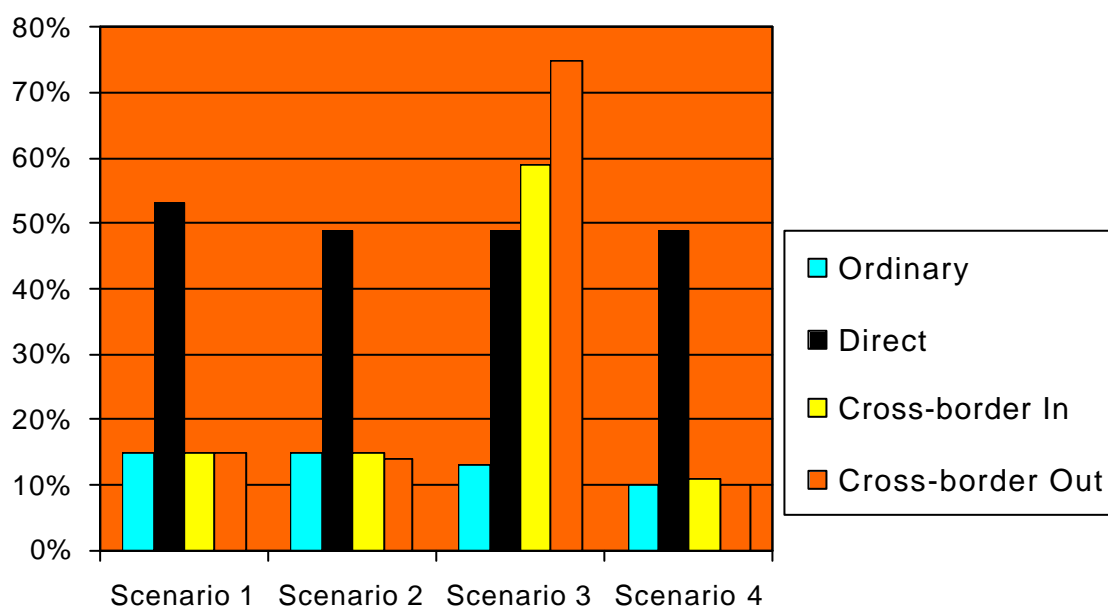
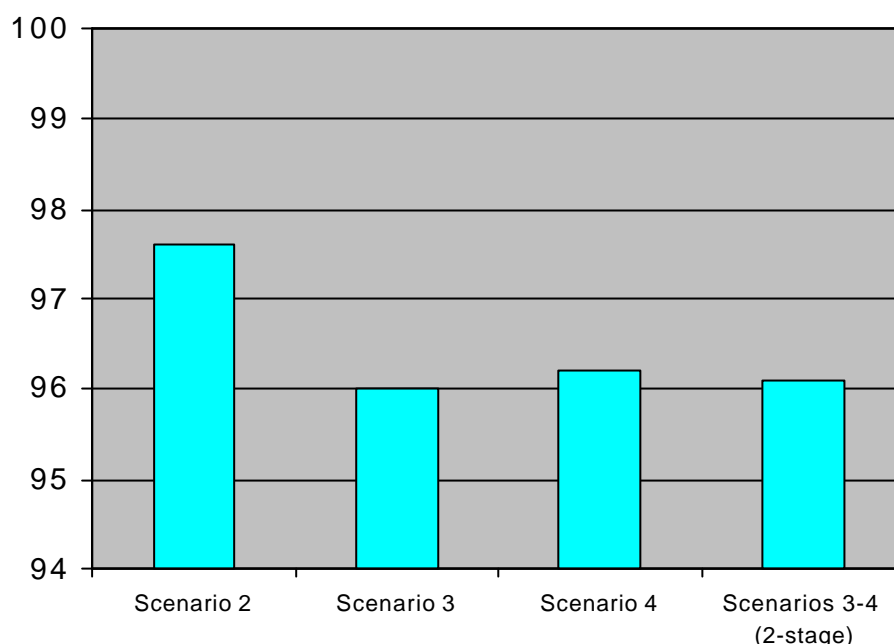


Figure 18: USP employment in 2007 under different liberalisation scenarios

(Index, 100=USP employment in 2007 under the reference scenario, Scenario 1)



On the employment side, the most striking feature is again the induced cross-border mail under Scenario 3. There has been under this Scenario a significant shift of business, and employment, from the universal service provider to competing providers of cross-border mail (who may of course include the universal service providers from other Member States). The assumptions we have made about induced cross-border mail result in less change in the prices charged for ordinary domestic mail by universal service providers under Scenario 3 than under full liberalisation (Scenario 4). Lower prices result in higher volumes, and thus a slightly smaller effect on employment in the universal service providers, under Scenario 4.

Not surprisingly, the margin implications of partial liberalisation also lie midway between no further liberalisation and full liberalisation. Under Scenario 2 the average margin falls back in 2003 from 4% to 3%, and recovers to 4% by 2005. Under Scenario 3 the average margin also falls to 3% in 2003, but takes longer to recover, reaching 4% again only in 2007.

We have also looked at liberalisation in two stages. That is, there might be a decision, as in Scenario 3, to undertake partial liberalisation in 2003 (direct mail, cross-border mail, ordinary mail items over 50g), and then to move on to full liberalisation as in Scenario 4 in, say, 2005. On the assumptions used in the model, the end result is very similar by 2007 or 2008 to that of full liberalisation in 2003. But the path there is different. In 2003 and 2004, there is the Scenario 3 shift towards cross-border mail, but there is not yet the major fall in universal service provider prices which full liberalisation brings. Thus ordinary mail volumes carried by the universal service provider fall slightly (by an average of 1%) in 2003, instead of growing slightly (by an average of 2%). But universal service provider revenue only falls by 2% in 2003, instead of by the 5% seen under Scenario 4. These scenarios are compared in the Appendix to this report.

MMD
February 1999

APPENDIX: SUMMARY SCENARIO COMPARISONS

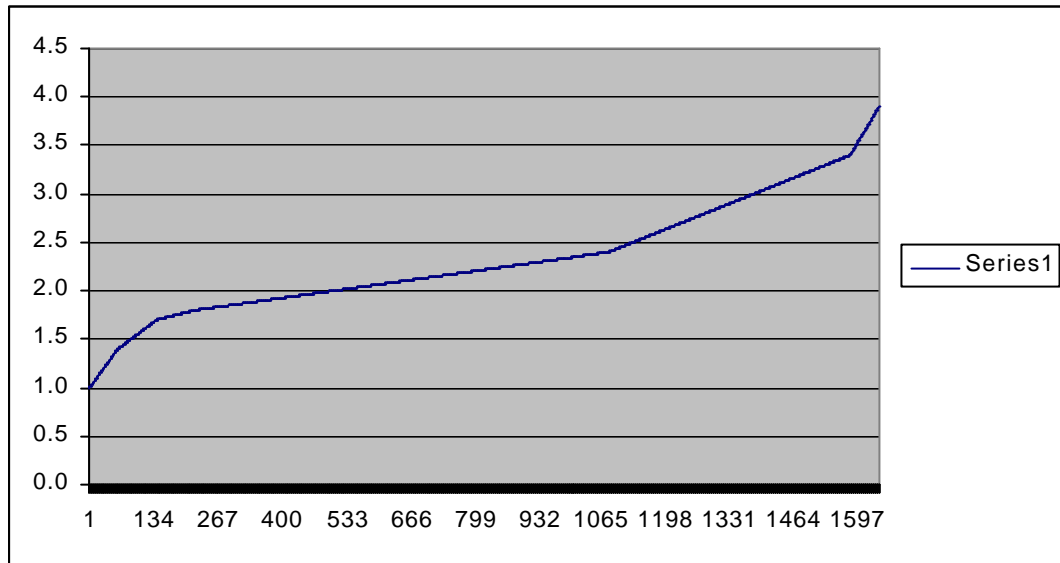
The table below summarises the comparison between the main scenarios discussed in the report, at the level of the European Union as a whole, and for the total market (all providers together) except for market share, where it is the share of the universal service providers which is given:

	2003				2007			
	Scenario 1	Scenario 3	Scenario 4	Scenarios 3-4	Scenario 1	Scenario 3	Scenario 4	Scenarios 3-4
	Status Quo	Partial	Full	Partial then full	Status Quo	Partial	Full	Partial then full
Volumes <i>Index, 1997=100</i>								
• Ordinary	108	107	112	107	114	113	119	119
• Direct	130	134	134	134	151	157	157	157
• X-border out	110	167	113	167	115	175	119	118
• X-border in	110	167	113	167	115	175	119	118
• Total mail	114	117	118	117	124	128	129	129
Revenues <i>Index, 1997=100</i>								
• Ordinary	109	107	103	107	115	113	110	110
• Direct	131	127	127	127	153	149	149	149
• X-border out	110	167	105	167	115	175	110	110
• X-border in	110	152	105	152	115	159	111	111
• Total mail	113	112	108	112	123	122	118	118
USP market share by volume <i>%</i>								
• Ordinary	97%	96%	96%	96%	97%	96%	95%	95%
• Direct	91%	83%	83%	83%	91%	83%	83%	83%
• X-border out	91%	57%	85%	57%	89%	55%	83%	83%
• X-border in	91%	58%	88%	58%	89%	57%	85%	85%
• Total mail	95%	90%	91%	90%	95%	89%	91%	91%

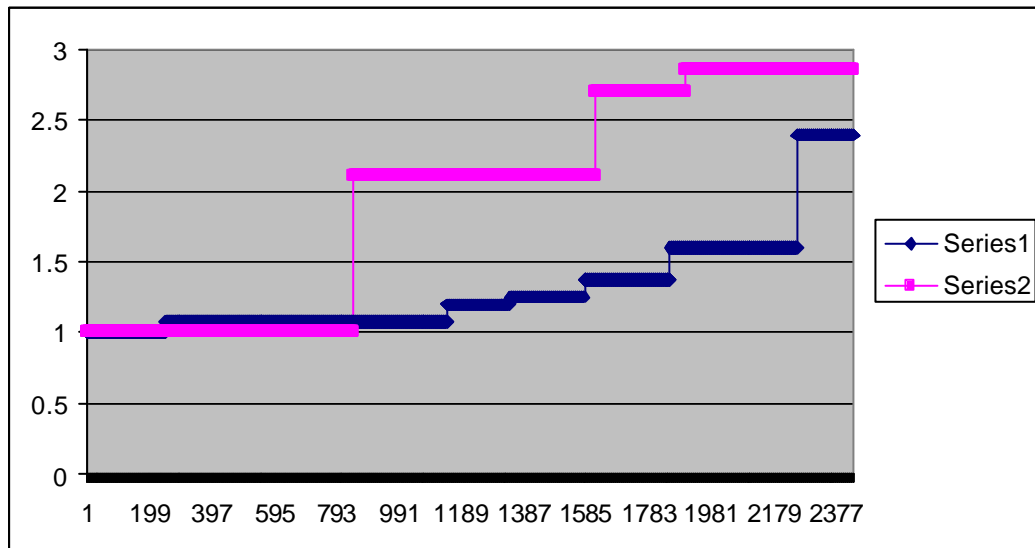
ANNEX 1: DISTRIBUTION COST CURVES

As mentioned in the main report, we have had to estimate the variation in distribution costs with volume from four of the distribution cost curves shown in Annex 3 to the NERA report on the cost of the universal service. Our estimates are as follows:

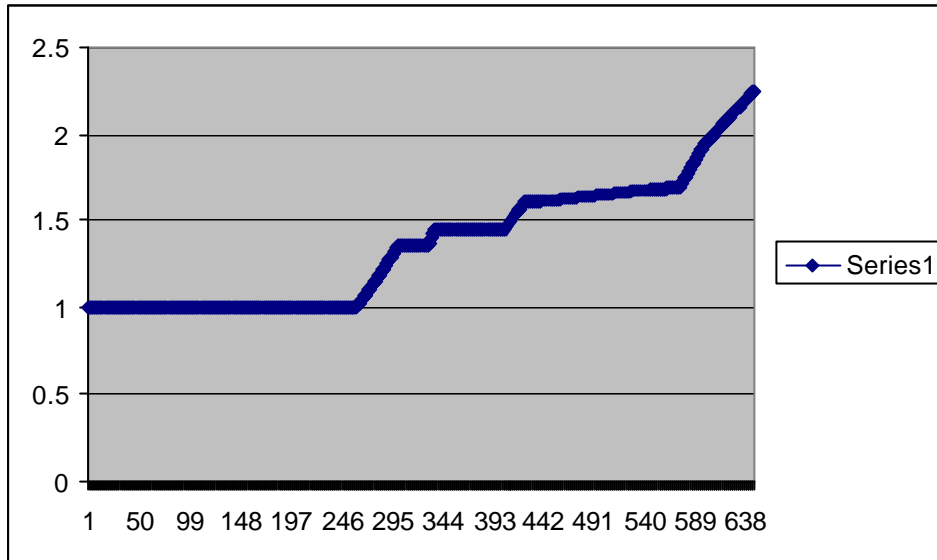
Finland



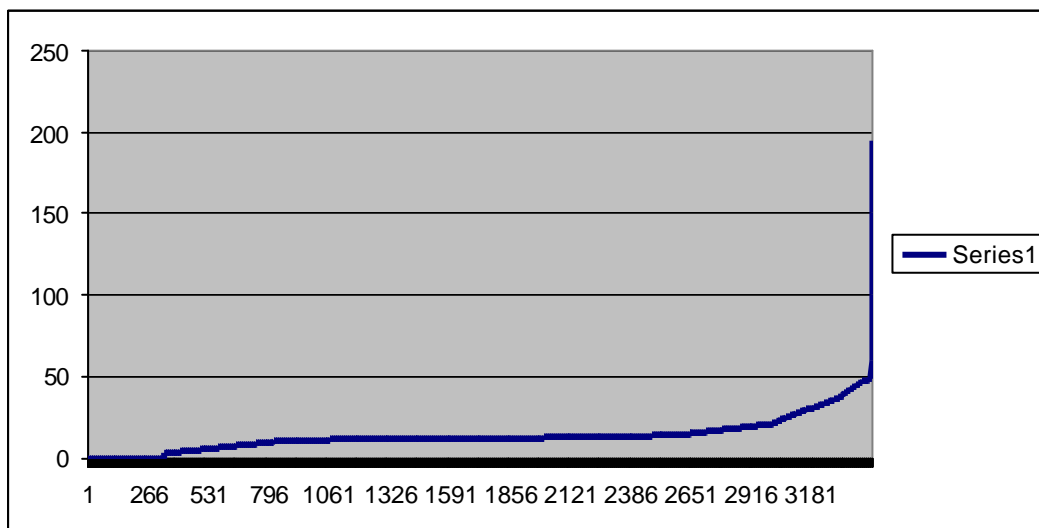
France



Ireland



Austria



In Finland and the UK, these curves have a steep initial section. In France, Austria and Ireland, they appear to have a flat initial section, followed by a step or steep climb. In most countries there is a linear or nearly linear central section, followed by a steeply rising portion at the expensive end. The cheapest mail to deliver is considerably cheaper than the average. The most expensive is much

more expensive. There is a wide area in the middle where the unit cost of delivery seems only to vary gradually with volume.

Using the estimated figures for each of the named countries, and those supplied by Royal Mail for the UK, we have in each case estimated:

- the value of the cost index at 25% and 75% of the volume, to give the slope of the linear part of the curve
- the point at which that linear section of the curve would, if extended, cut the Y-axis
- the point of intersection between the curve and the Y-axis (if there is one)
- the point at which a line, parallel to the linear section of the curve, drawn from a point on the Y-axis half way from the point identified in b) above to the point identified in c) above (or the origin if there is none), would cross the curve.

The information above has been used to estimate the slope of the left-hand section of the curve, from its actual intersection with the Y-axis (or from zero, if it crosses the X-axis before the origin) to the point where it becomes linear.

We have then extrapolated to the other Member States the distribution cost curves derived in this way from the NERA study for the 5 countries. The basis for the extrapolation has been the number of items of mail delivered per square kilometre in each country (from the CTcon network access report). That indicator has been chosen for simplicity: it seems the single factor generally regarded as most significant in the cost of distribution, although there are of course many others.

Thus the key cost information and estimates used in the model are as follows:

Country	ECU@25%	ECU@75%	Fixed costs %	Non-deliv costs %	Margin on sales %	Mail vol (m)	Area (km2)	Pop '000	Items Mail/km2	Rank 1
Belgium	0.07	0.10	0.0%	45.0%	-1.1%	3,056	30,518	10,137	100,138	14
Denmark	0.07	0.10	37.0%	22.0%	6.0%	2,798	43,094	5,228	64,928	12
Finland	0.11	0.16	14.0%	48.2%	6.3%	2,121	338,147	5,108	6,272	2
France	0.15	0.29	26.0%	29.6%	-0.8%	24,100	543,965	58,143	44,304	9
Germany	0.23	0.46	25.0%	23.3%	2.2%	19,963	357,022	81,661	55,915	10
Greece	0.17	0.28	9.0%	46.4%	-17.8%	460	131,625	10,459	3,495	1
Ireland	0.22	0.37	24.0%	32.7%	3.7%	532	68,894	3,582	7,722	3
Italy	0.09	0.18	0.0%	70.0%	-7.6%	6,590	301,316	57,300	21,871	7
Luxembourg	0.06	0.08	0.0%	45.0%	19.6%	164	2,586	410	63,418	11
Netherlands	0.06	0.08	0.0%	45.0%	14.1%	6,415	41,028	15,459	156,357	15
Austria	0.08	0.11	0.0%	46.0%	3.7%	3,227	83,859	8,047	38,481	8
Portugal	0.10	0.16	31.0%	30.4%	3.2%	1,407	91,906	9,917	15,309	6
Spain	0.09	0.13	20.0%	29.6%	-24.6%	4,368	504,790	39,210	8,653	4
Sweden	0.26	0.36	0.0%	45.0%	2.4%	4,808	410,934	8,827	11,700	5
UK	0.04	0.06	15.3%	46.2%	10.3%	16,654	241,751	58,594	68,889	13

In the absence of any other information, and using this ranking as a guide, we have assumed that the distribution cost curve for:

- Belgium, Denmark, Luxembourg and the Netherlands is the same as for the UK
- Greece and Portugal is the same as for Ireland
- Spain and Sweden is the same as for Finland, and
- Germany and Italy is the same as for France.

Clearly, a great deal more information on how costs change with changes in volume in the different Member States would be needed before any authoritative estimate could be made of the profit implications of any chosen liberalisation scenario. The estimate described here is no more than a first approximation on the basis of the information available to us.

ANNEX 2: THE MACRO SHELL

When the model is loaded, the macro shell takes control of what the user sees and can do, creating its own customized interface. In particular it removes the following standard Excel features:

- the Excel caption
- the menu system
- Hot keys
- Tool bars
- Row and column headers
- Gridlines and other features normally offered as options in Excel.

In place of these features, the macro shell provides a user-friendly system of buttons and controls that enable the user to:

- Navigate around the model
- Select options and enter data
- Print selected data
- Prepare charts of selected data.

In addition, the macro shell performs the following functions transparently for the user:

- Transfer of the input data to the intermediating layer
- Control over recalculation of the model
- Automatic scaling of the screen display.

All these changes from normal Excel features are reversed when the user exits from the model.