

Annex 18

Frontier Economics' Report on "Volume Modelling for the Price Control"

A Response by Royal Mail

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1. Introduction

- 1.1 An important element in setting a price control is the development of a set of volume projections and sensitivity testing of these projections in order to identify risks. The area of volume forecasting was highlighted by Postcomm in its September 2004 Consultation Paper¹ and Royal Mail was asked to provide an analysis of its own volume projections for the current price control. This analysis was included as Annex C of Royal Mail's December 2004 Response to Postcomm's September 2004 Paper.² Postcomm also requested, as part of Royal Mail's submission of its response in January 2005 to Postcomm's Business Plan Questionnaire (BPQ), that Royal Mail should provide a very detailed set of forecasts for volumes (and also prices, revenues and costs) up to the year 2010/11. The request covered information on volumes by product, weight step, format and other key dimensions involving several thousand lines of data. The projections were provided to Postcomm together with a detailed commentary on the projections themselves.³ As part of the BPQ, Postcomm requested also that it be provided with the models used by Royal Mail in the preparation of its projections. These were provided as requested, and additionally, Royal Mail made a number of presentations to Postcomm and its consultants in January 2005 which covered the key elements of the projections as well as reports on the basis, contents and properties of the models.⁴
- 1.2 Postcomm retained a consultant, Frontier Economics, to support and assist Postcomm in the development of its volume projections for the price control. Part of this work involved a review of some of Royal Mail's models in this area. Frontier's work is set out in a report by it which was placed on Postcomm's website after the publication of Postcomm's initial proposals document on 1 June.⁵
- 1.3 Frontier's report contains two main sections. First, a review of Royal Mail's mail volume projections prior to taking account of the impact of competitive entry which is based on Royal Mail's inland letter traffic model (ILTM). Secondly, the development of projections for mail volumes handled by entrants, either through downstream access or bypass. Royal Mail's response reviews both sections of Frontier's report and the volume projections presented by it in its report.
- 1.4 Royal Mail's response consists of two sections. Section 2 reviews Frontier's comments on the ILTM and section 3 reviews Frontier's approach to projecting entry and its overall volume projections. In its report, Frontier's makes various statements regarding the theoretical validity of its approaches to econometric modelling and to the economic analysis of competitive entry. Royal Mail has invited leading academics on these

¹ Postcomm. September 2004. *2006 Royal Mail Price and Service Quality Review :Consultation on Principles*

² Royal Mail. December 2004. *2006 Royal Mail Price and Service Quality Review: Royal Mail's Response*

³ Royal Mail. January 2005. *Business Plan Questionnaire Submission*. File No. 2032, 2048.

⁴ Royal Mail. January 2005. *Business Plan Questionnaire Submission*. File No. 2036, 2037.

⁵ Frontier Economics. June 2005. *Volume Modelling for the Price Control: A Report Prepared for Postcomm*.

subjects to comment on Frontier's methodological and theoretical position. These reviews are by Professor Jean-Pierre Florens on econometric modelling and Professors Helmuth Cremer and Philippe De Donder on competitive entry and are contained in a separate annex to Royal Mail's response to Postcomm's initial proposals document.⁶

⁶ Cremer , Helmuth, Philippe De Donder and Jean-Pierre Florens. August 2005. "Frontier Economics' Report on "Volume Modelling for the Price Control": A Review of Methodological Issues". In *Royal Mail's Response to Postcomm's Initial Proposals for the 2006 Price and Service Quality Review*. Annex 19.

2. Frontier Economics' Section 2 on "Market Volume Growth"

Royal Mail's Approach to Projecting Volumes

- 2.1 Section 2 of Frontier's report reviews Royal Mail's econometric model of inland letter traffic (ILTM) and its use, together with additional information, in developing Royal Mail's volume projections. The development of these is a key element of Royal Mail's overall planning process and its objective is to produce a business forecast over the medium and longer term (up to ten years). The ILTM is the basis for Royal Mail's projection of addressed inland letter traffic pre-competitive entry (the modelling of competitive entry is reviewed in the next section). Postcomm and Frontier refer to this as a projection for the total market although strictly it is a projection only of Royal Mail's volumes prior to assessing the impact of competitive entry on Royal Mail.
- 2.2 The pre-competitive entry component of Royal Mail's volume projection is developed in a two stage process as set out in Royal Mail's BPQ submission in January 2005.⁷ First, the ILTM is used to develop a projection of traffic volumes given assumptions for the explanatory variables in the model.⁸ This process takes account of out of sample residuals between projected and outturn traffic volumes. Secondly, information is used to try and take into account prospective future changes in the demand for mail given that a projection is required up to ten years ahead and the view of experts in this area is that there are significant and continuing changes in the demand for mail such as the growing impact of technological change and additional e-substitution. This part of the process applies "additional net trend adjustments"⁹ which are used to modify projections obtained from the three equations in the model after it is run with assumptions for future values of explanatory variables. Royal Mail traffic outturns are monitored closely to track and understand differences that have occurred between projections and outturns as are other sources of information such as traffic trends in other countries. All this information is brought together in a bi-annual re-estimation of the model, the last of which occurred in 2004 to produce the version of the model used for the price control, ILTM(2004).
- 2.3 It should be emphasised that the primary purpose of the forecasts from the modelling is to provide traffic projections for use by Royal Mail as part of its planning process. Accordingly, the focus is very much on a forward-looking perspective.

Frontier Economics Conclusions on Royal Mail's Approach to Projecting "Market Volume Growth"

- 2.4 Frontier reaches four conclusions on "RM's market growth forecast". Each of these is reviewed in turn together with related material in Section 2 of Frontier's report.
- 2.5 **Frontier Economics' first conclusion** is that:

"The econometric model (ILTM(2004)) is expected to provide a reasonable basis for forecasting market volume growth in the next price control period."(p.26)

⁷ Royal Mail. January 2005. *Business Plan Questionnaire Submission*. File No. 2032.

⁸ These are economic growth, demographic growth, letter prices, First Class quality of service, prices of non-mail advertising and trend terms.

⁹ Frontier refers to the additional net trend adjustments as "overlays".

Royal Mail agrees that the ILTM provides a “reasonable basis” and starting point for the development of its traffic projections. The model shows no sign of breakdown within its sample period (that is, up to 2003Q2) and clearly passes a full set of standard statistical tests. However, this does not imply that in using the model further information about prospective changes to customer behaviour and technology in the future should not be taken into account to help guide and improve the long term projections from the model. To ignore such information would be to assume that the relationships identified by the model from analysis of past trends will hold indefinitely into the future and this itself is an assumption that must be tested, albeit in a non-statistical way.

2.6 As Professor Florens concludes in his comments on Frontier’s report:¹⁰

“An econometric forecast is the best way to describe the future if nothing changes except the explanatory variables incorporated in the model: the behaviour of agents and of the non modelled environment should be stable. Then also the econometric structural model is useful because this non-statistical analysis may take the form of a change in the parameters.

This change in the parameters or more generally the use of other information is necessarily not based on a statistical argument (because in that case it should have been introduced in the model). The history of forecasting is an argument to weight econometric predictions by other sources of information but not in a statistical way” (p.5)

Royal Mail agrees fully with this conclusion.

2.7 **Frontier Economics’ second conclusion** is that:

“While RM have provided a range of standard within-sample statistical tests, they make little reference to these or any out-of-sample tests to support their assertion that there is a risk that projections based on ILTM(2004) will over predict mail growth.”

Royal Mail considers Frontier’s second conclusion to be of little relevance in assessing whether the ILTM(2004) is likely to over predict mail growth. It is unclear how standard within-sample statistical tests up to 2003Q2 or out-of-sample tests on historical data and outturns can provide a robust assessment of whether or not the model is likely to over predict mail growth over the period 2005/06 to 2010/11.

2.8 **Frontier Economics’ third conclusion** is that:

“Our analysis to date of the statistical properties of the model fails to provide convincing evidence for RM’s hypothesis that the model would be expected to break down during the period.”(p.26)

Royal Mail interprets Frontier to mean “to break down during the period” it was requested to review for the next price control period, that is, up to 2010/11. Again, it is unclear how or why analysis of data up to 2003Q2 could be able to provide convincing evidence of a model either breaking down or not breaking down between then and

¹⁰ Annex 19 on *Methodological Issues* by Professors Cremer, De Donder and Florens.

2010/11. Much of Professor Florens comment is about this point and his conclusion was reported above. The real issue, which Frontier fails to address, is the prospect of trends changing in the future. From a business forecasting perspective it is not sufficient just to look backwards. There should be an attempt to incorporate other information relevant to the projections and necessarily such information is more tentative. On this fundamental point Royal Mail concludes that it is essential to take a forward-looking perspective in developing its volume projections and to take account of other information in addition to that contained in the time series used to estimate the model and out of sample residuals between forecasts and outturns.

2.9 With regard to the latter, information was provided to Postcomm and Frontier on out of sample residuals. This was contained in the computer model of ILTM(2004) which was populated with data up to 2004Q3. Frontier reports calculations using data up to 2004Q1 (p.21).

2.10 Extending this information on out of sample ILTM(2004) projections (that is, after 2003Q2) to 2005Q2 indicates that the Second Class traffic model has again tracked the reported outturn data reasonably well and the model errors on average have been low. In the case of the First Class and other (mainly presort) traffic models the projections have, in general, tracked the directional movements of traffic well but out of sample the models have tended continuously to over project traffic growth. Figures 1 and 2 convert the quarterly projections and outturn data series back into an index (traffic in 1985Q2 =100) in order to assess the cumulative impact of the projection errors on the level of traffic. It is clear from figures 1 and 2 that the extent of over projection from ILTM(2004) for First Class and other (mainly presort) traffic is substantial with a tendency to increase over time, especially in the case of the latter. It is precisely to attempt to accommodate prospective developments of this type that Royal Mail has adopted a set of additional net trend adjustments to the projections from ILTM(2004).

Figure 1. First Class Traffic Per Working Day: Projections from ILTM(2004) and Outturns (1985Q2=100)

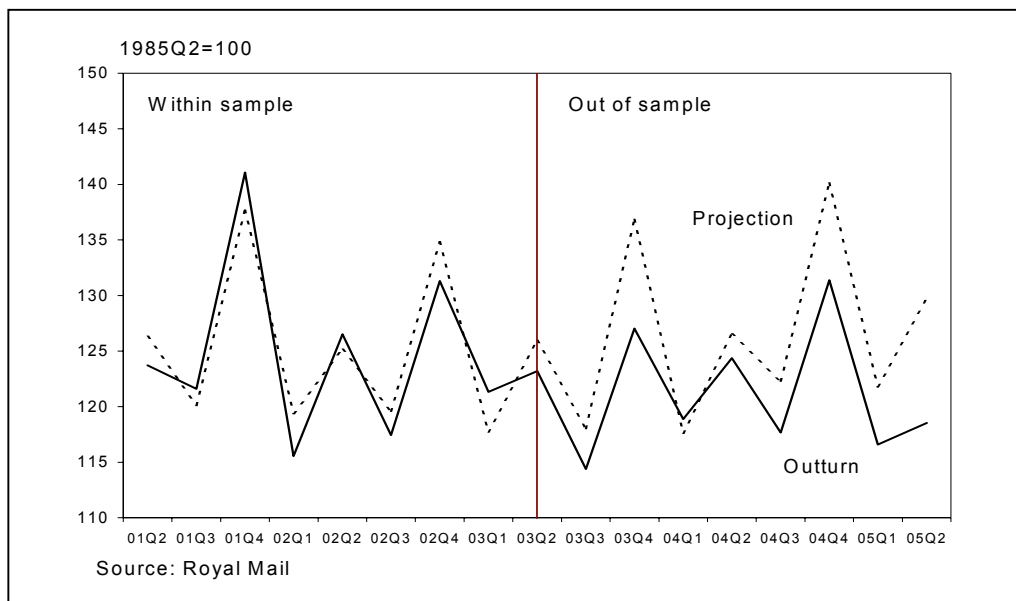
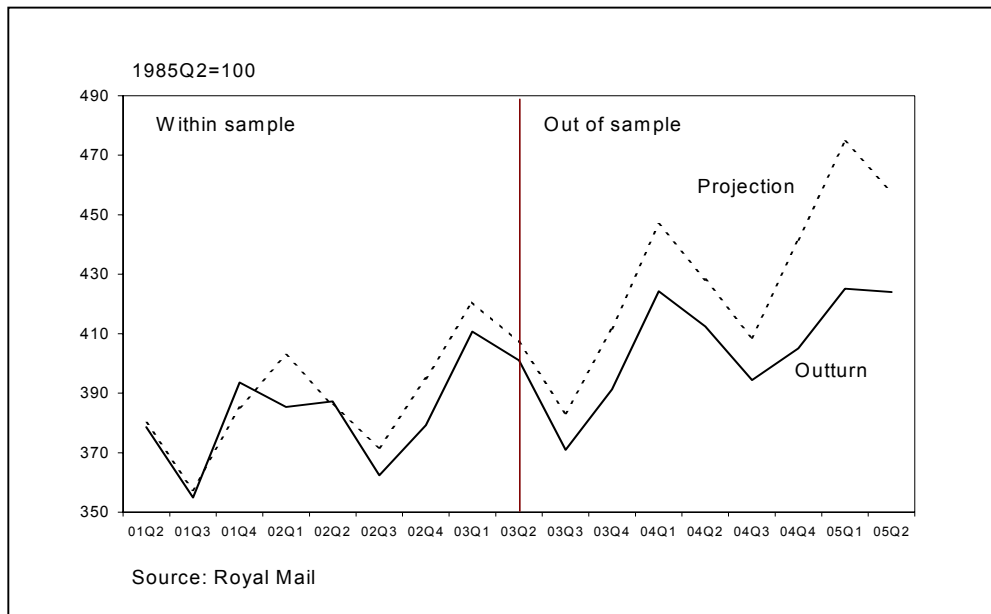


Figure 2. Other (Mainly Presort) Traffic Per Working Day: Projections from ILTM(2004) and Outturns, (1985Q2=100)



2.11 As in the analysis of volume projections made for the current price control,¹¹ there was evidence available in the data provided to Frontier of over prediction by some elements of the model. However, the more general point relates to the position regarding the use of other information to inform and improve projections from the model and here Royal Mail agrees with Professor Florens' conclusion that it is important to take all information into account in developing projections over the longer term.

2.12 **Frontier Economics' final conclusion** is that:

"It is inappropriate to mechanically base the magnitude of "overlays" on data from the US, and more generally, the magnitude of the overlays has not been considered in the context of the properties of the model."(p.26)

The issue that Frontier raises is again largely methodological and relates to an effective mechanism to try to anticipate future developments in the UK mail market. As Professor Florens concludes in his comments on Frontier's report¹²:

"The US demand is not interesting by itself: if it was the variable should have been included in the model. The US demand is interesting because experts use it to form their opinions. Consequently data on US demand should not be used statistically but as a non-statistical element which appears to be relevant for forecasting."(p.5)

Royal Mail follows this approach by basing its projection on the ILTM but then applying additional net trend adjustments based, in particular, on information from the US postal market. Again, the central issue is whether, as Frontier believes, a projection looking forward to 2010/11 can be made solely by looking backwards from 2003 or whether other information should be included to try to anticipate changes in future years. The

¹¹ Royal Mail. December 2004. *2006 Royal Mail Price and Service Quality Review: Royal Mail's Response*. Annex C.

¹² Annex 19 on *Methodological Issues* by Professors Cremer, De Donder and Florens.

latter is the position Royal Mail has adopted and this is in line with Professor Florens' conclusion.

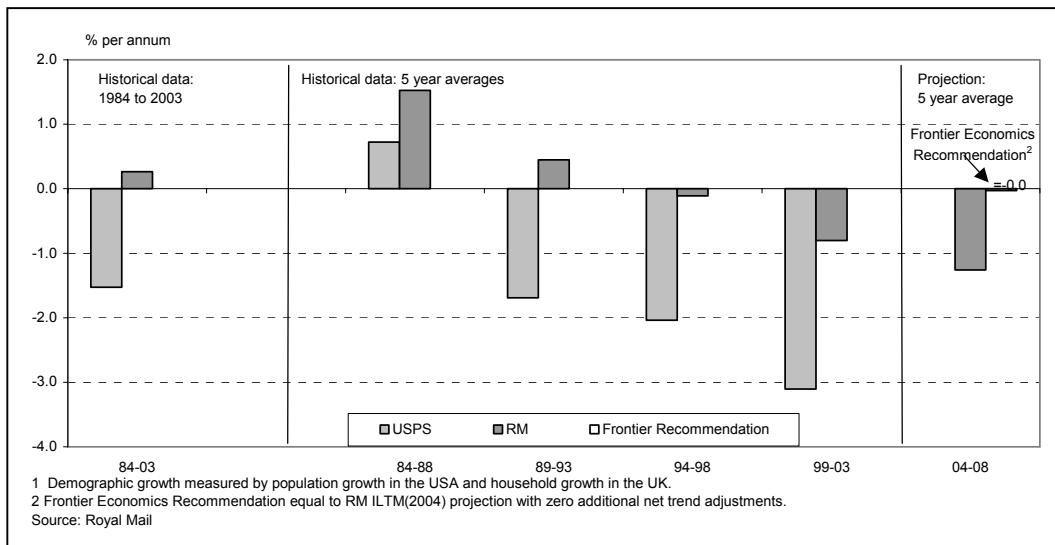
- 2.13 Considering further the specifics of Frontier's comments of the use of US data, it does not consider the information from the United States Postal Service (USPS) to be a relevant source of information of prospective future developments in the UK during the next price control period for two main reasons. First, mail demand in the US is twice as high as in the UK, implying that the US market is closer to saturation point than the UK market; and secondly that the use of mail differs across the two countries, in particular with regard to payment habits (for example, a higher proportion of US individuals pay by cheque, rather than through direct debit transactions). With regard to the first point, it could be argued that the fact that the USA is closer to saturation point than the UK supports the justification for using the USPS as an indicator of future conditions in the UK.
- 2.14 With regard to its second point, Frontier states that because of the differences in payment habits between individuals in the USA and Europe, the source of decline in the USA might not apply in the UK. It suggests that a key driver of mail volume growth in recent years has been the increasing role of electronic bill presentment and payment (EBPP) and that the replacement of payment by cheque with EBPP may explain the reduction in US mail volumes. Since the current level of payment by direct debit in Europe is significantly higher than that in the USA, Frontier's argument is that mail volume trends experienced in the USA are unlikely to happen in the UK.
- 2.15 The relevance of its example to question the use of US data as a valid source of information is not clear. The decline in US first class mail as a result of EBPP is not obvious. Indeed, some evidence seems to suggest that the decline of first-class mail as a means of bill payment and presentation should not be over-estimated.¹³ Arguably, EBPP would affect only consumer to business mail. Some evidence, however, indicates that the proportion of US first class single piece mail sent by households has remained relatively constant since 2000, indicating that the shift to electronic payment does not seem to be having a major impact on household mail as yet. There is, however, evidence that electronic substitution appears to affect business-originated mail.¹⁴ Thus, it could be argued that it is unlikely that the reduction in US mail volume growth could be attributed solely to the increase in EBPP, as Frontier's example might imply.
- 2.16 Figure 3 clearly shows that the difference between the rate of mail volume growth and economic activity plus demographic growth (the two main drivers of traffic growth in the US and UK over the past two decades) is declining in both countries and the decline in the US is leading that in the UK. This is another way of presenting the material on USPS volumes contained in the report on ILTM(2004).¹⁵ Royal Mail's projections reflect these changes to some degree. In contrast, however, Frontier's recommendation to not adopt additional net trend assumptions would assume a reversal of the long-term decline in the gap between traffic growth and GDP plus demographic growth.

¹³ Levy, D. 2005: 'Selective Rate Discounts to Preserve First-Class Mail Volume'. In M. Crew and P. Kleindorfer (eds), *Regulatory and Economic Challenges in the Postal and Delivery Sector*, Boston, MA: Kluwer Academic Publishers.

¹⁴ See, eg, Levy (2005), op cit, and Nader, F. (2005), 'Forecasts', Background Paper No. 3, February 24th. Available at www.postinsight.pb.com.

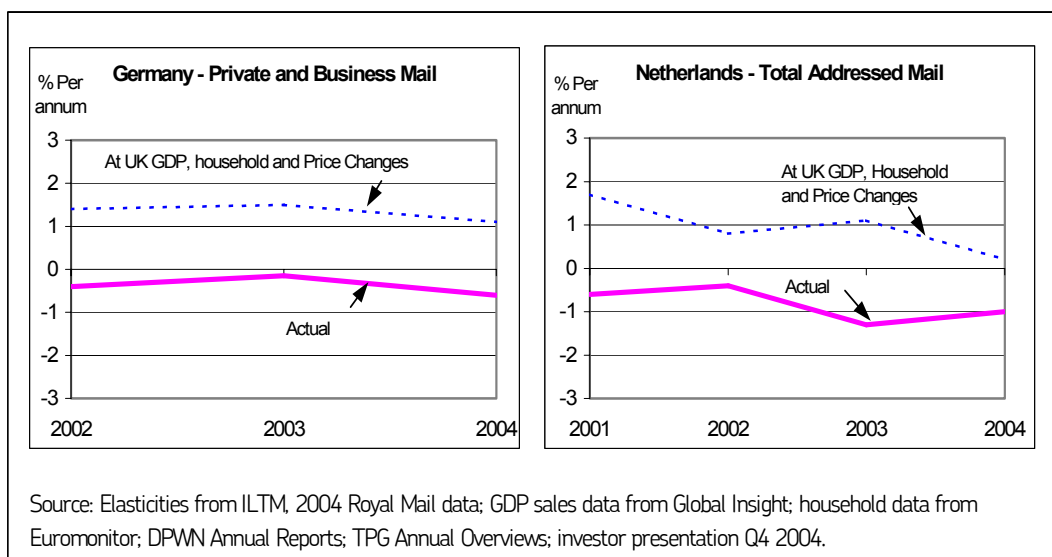
¹⁵ Royal Mail. December 2004. *Inland Letter Traffic Model 2004 (ILTM(2004)) and Analysis of Prospective Changes in Trends*.

Figure 3: Royal Mail and USPS annual traffic growth minus economic activity and demographic growth, % per annum¹



2.17 Frontier suggests that the USPS experience may not be a good indicator of future trends in the UK mail market and recommends that Royal Mail should examine *“other countries with more similar characteristics to the UK to provide an alternative view on prospective demand trends”*. (p.23) As noted above, Royal Mail monitors and reviews volume data for other countries and major postal operators on a continuing basis as part of the on-going assessment of Royal Mail’s projections. However, this information is not available on a consistent basis and does not cover a long enough time period to allow Royal Mail to repeat the analysis undertaken on USPS data for other countries. Nevertheless recent data from Germany and the Netherlands shown in figure 4 indicates that mail volumes in these countries have been declining over the past three or four years.

Figure 4: Mail volume growth rates in Germany and the Netherlands



2.18 To some extent the lower rate of mail volume growth in Germany and the Netherlands relative to the UK over the recent past reflects differences in economic growth, demographic trends and price changes. Royal Mail has recalculated the mail volume growth rates in Germany and the Netherlands to take account of such differences¹⁶. The results indicate that if Germany and the Netherlands had experienced UK rates of economic and demographic growth over the past four years and postal prices had also increased in line with those in the UK, mail volumes in both Germany and the Netherlands might have increased by, on average, about 1% per annum, just below the rate in the UK in the last couple of years. Evidence of this type, in addition to that obtained from the US, suggests that structural changes are exerting a downward influence on the demand for mail in industrialized countries and the negative net trends adjustments that Royal Mail has added to its projections from ILTM(2004) are both valid and in line with a best practice approach to forecasting outlined by Professor Florens.

2.19 As part of its conclusion on “overlays” in the context of the properties of the model Frontier claims that:

“...in 2006/07, the probability of observing the low-range overlay forecast of 1.7% is just 2.7% and the probability of observing any values in the low-range after 2006/07 is less than 0.2%. Similarly, the probability of observing the central overlay growth rate of 1.7% in 2007/08 is 4.1%, and 1.8% or less for any values after 2007/08.”(p. 51)

Even allowing for changing values of the explanatory variable in the forecast period, which the results above ignore, the probability remains very low and these conclusions are summarised in figures 5 and 6 of Frontier’s report (pp 24, 25).

2.20 However, the results reported by Frontier make little sense for the additional net trend adjustments made by Royal Mail are applied precisely to reflect prospective changes in future trends. As Professor Florens states:¹⁷

“The graph presented in the Frontier report (fig 6, p.25) is not fully relevant. If an overlay on the trend is accepted the confidence interval should incorporate this overlay. The confidence intervals reported by Frontier illustrate the role of the noise in the prediction and not a change in the behaviour of the consumers. The comparison between mean prediction with overlay and confidence interval without overlay is therefore questionable.”(p.5)

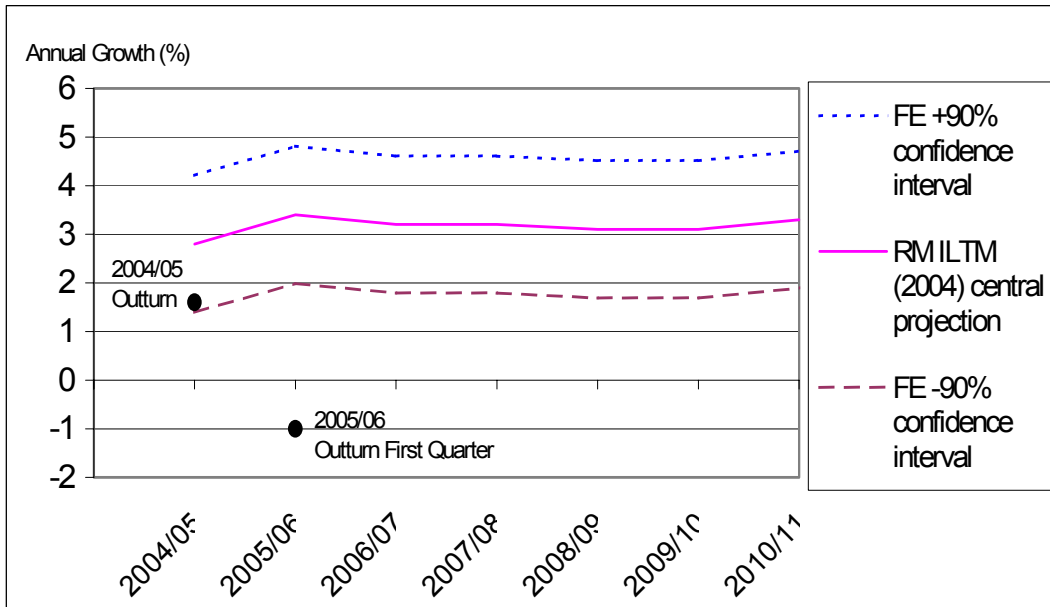
The additional net trend adjustment cannot be judged against the statistical noise associated with assuming that its value is zero but rather it should be judged in terms of its merits in adding information regarding prospective changes in demand.¹⁸ As figure 5 shows inland letter traffic growth outturned just within the lower range of Frontier’s 90% confidence interval in 2004/05 and the year-on-year growth rate for the first quarter of 2005/06 was well below the lower bound.

¹⁶ The analysis adopted income and demographic elasticities of unity and a price elasticity of -0.2.

¹⁷ Annex 19 on *Methodological Issues* by Professors Cremer, De Donder and Florens.

¹⁸ In this regard, Royal Mail finds extraordinary Frontier’s proposal to accept “overlays” but only after a three year delay (p.25). For the avoidance of doubt, this proposal does not “deal with RM’s concerns about downside risk in the forecasts”. (p.25)

Figure 5: Frontier Economics' Total Traffic Projected Volume Growth using ILTM(2004) with 90% confidence intervals, % per annum



Frontier Economics' Recommendations on Forecasts for the Determination of the Final Price Control

2.21 Frontier's report also contains a number of recommendations regarding volume forecasts for the determination of the final price control. Royal Mail wishes to respond to the last of these:

"The magnitude of any overlays should be based on a proper assessment of the model performance up to the time the final proposals are made. Postcomm and RM should continue to assess the predictions of the model as new data becomes available, in order to ensure that the overlays are proportionate to any observed weaknesses of the model."(p. 26)

It is appropriate to take account of out of sample residuals between projected and outturn traffic and this is a part of Royal Mail's process for developing volume projections. Outturn data will be available to 2005Q2 when Postcomm makes its final proposals for the price control which it is currently proposing to set to the beginning of 2010. As discussed above at some length, it is essential to take account of other information on a forward-looking basis and not to restrict projections to a backward-looking approach. Royal Mail's position remains that the ILTM is a robust basis from which to develop volume projections but that all relevant information, whether from the model, its out of sample performance or from other sources should be used to develop long term projections. Royal Mail will continue to apply additional net trend adjustment as part of its long term projections of volumes.

- 2.22 With regard to the development of these projections and uncertainties around them Royal Mail wishes to point to an important issue raised in Professor Florens comments:¹⁹

“The selection of a single value for forecasting is a decision problem and its solution depends on the user’s loss function....Forecasting errors may encourage the regulator to make poor decisions where impacts may be highly asymmetric (ie. overestimating the future demand for mail may have considerably higher consequences for welfare than underestimating demand). In this case the “best” forecasting rule is usually a fractile of the distribution (the lower quantile for example) and not a control parameter (as median or mean)”. (p.4)

Royal Mail believes Postcomm should focus on considerations of more substantive issues of this type in developing its final set of volume projections.

Concluding Comments on Frontier’s Work on “Market Volume Growth”

- 2.23 The central issue raised by section 2 of Frontier’s report is a methodological one; namely, the extent to which volume projections should take account of information in addition to that used to estimate a model or its performance outside of the sample period through comparison of forecasts with outturns. As Professor Florens states in his conclusion, all information is relevant and Royal Mail tries to take account of this point in developing its long term projections through its additional net trend adjustments. By contrast, Frontier’s approach is backward-looking and mechanistic.
- 2.24 Royal Mail notes that Postcomm used the pre-competitive entry volume projections it provided to Postcomm as part of the January 2005 BPQ, which include Royal Mail’s additional net trend adjustments, in developing its initial proposals published in June 2005.

¹⁹ Annex 19 on *Methodological Issues* by Professors Cremer, De Donder and Florens.

3. Frontier Economics' Section 3 on "Volume Shares"

- 3.1 Section 3 of Frontier's report presents its work on competitive entry and the resulting impact on market shares of Royal Mail and entrants. In particular, it covers the background to Postcomm inviting Frontier to produce a model of competitive entry and an outline of that model; key parameters in that model and their values; high level volume projections and conclusions on volume shares. Royal Mail responds to each of these areas.

Frontier's Competitive Postal Market Model (CPMM)

- 3.2 Section 3 of Frontier's report begins with a summary of criticisms of Royal Mail's entry pricing model (EPM) (pages 27-28). This covers old ground on which Royal Mail has responded previously.²⁰ The EPM was developed extensively in 2003 and 2004, including the introduction of downstream access into the model and "entrant routes" which average the service offerings of entrants at a higher level of traffic segmentation. The new version underpins papers in the public domain.²¹ As set out in these reports and papers, the EPM is an operational model which seeks to project the extent of competitive entry over the long term. This requires the setting of parameter values in a number of important areas relating both to the modelling of the overall extent of entry and also to the phasing and build-up of entry over time. The importance of these parameter values has always been made clear and the values themselves transparent. Sensitivities have been reported and Postcomm, which has been provided with the various versions of the model including the most recent (EPM(2004)), has been in a position to test readily the impact of alternative parameter values.
- 3.3 Postcomm requested Frontier to construct an alternative model of competitive entry, the competitive postal market model (CPMM). The model itself is based on and uses many of the underlying elements of the EPM but Frontier has developed the EPM in a number of ways, principally to give greater emphasis to competition for customers rather than segments of traffic. Frontier makes a number of strong claims regarding its model:

"This model – the CPMM – is based on the economic theory of competition and reflects expected consumer and entrant behaviour in the market. As such, it is easier to reconcile the CPMM with behaviour in the postal market than the route-based EPM." (p. 43)

"The CPMM is considered to be preferable to the EPM because it is transparent, it incorporates the main factors that are expected to influence decisions in the market, and it is economically sensible." (p. 43)

- 3.4 Royal Mail invited Professor Helmuth Cremer and Professor Philippe De Donder to comment on the methodological and theoretical basis of the CPMM as presented by Frontier in its report and their comments are contained in a separate annex to this response.²² With regard to the economic theory underpinning the CPMM they state:

²⁰ Royal Mail. 2003. *Entry Pricing Model 2003 (EPM(2003):Model, Analysis and Results*; Royal Mail. December 2004. *2006 Royal Mail Price and Service Quality Review: Royal Mail's Response*, Annex C.

²¹ Hill, Roger, Richard Robinson and Frank Rodriguez. 2005. "The Financial Equilibrium of Universal Service Providers in a Liberalised Postal Market". In *Regulatory and Economic Challenges in the Postal and Delivery Sector*, edited by M. A. Crew and P. R. Kleindorfer. Boston, MA: Kluwer Academic Publishers

²² Annex 19 on *Methodological Issues* by Professors Cremer, De Donder and Florens.

"We contest the qualification of the CPMM as an economic model. It is rather, like the EPM, an operational model, in the sense that the behaviour of economic actors is not actually modelled. Rather, at the heart of both the EPM and CPMM models lie various assumptions of the reactions of both postal operators (range, price, cost and quality of products offered) and customers (market shares taken by postal operators given their offerings). The main difference between CPMM and EPM is that the CPMM is less sophisticated and effectively much more ad hoc than the EPM. Nowhere in the CPMM is there a modelling of how the operators end up choosing the characteristics of their offering, and how the consumers decide which of the various products to buy. In other words, CPMM offers no model of entry, of strategic interactions between operators, and of consumers' demand behaviour." (p.8)

"The authors claim that "The first module (of CPMM) is a model of competition in the absence of switching costs.(...) Specifically, potential market shares are calculated by reference to a classical model of undifferentiated Bertrand duopoly with a quality and brand dimension added"(p. 30). And the authors have found an impressive way to summarize hundreds of papers on product differentiation in a spectacularly simple way: when the incumbent's price does not exceed that of the entrant by more than 10 percent, he keeps the entire market; otherwise he loses it all. It appears to be rather pretentious to qualify this as an "economically founded" assumption. For a model to yield the specific demand behaviour on which CPMM is based, one would need to make rather peculiar assumptions. Now it is clear that to construct scenarios of market liberalization one has to make some restrictive assumptions. But then one should be honest about their nature and not attempt to sell them on the basis of their "economic foundations". Here the authors effectively only use "back of the envelope" calculations." (p.8)

With regard to CPMM's focus on customers rather than segments of traffic, they note that:

"The main difference between EPM and CPMM is that the first is focused on segments of traffic or "routes" while the second is focused on customers. We do not think that this change of focus makes CPMM more transparent at all. Moreover, the focus on customers runs the risk of missing the geographical dimension of the sending and delivery of mail, which is of paramount importance in this sector." (p9)

Their overall conclusion on operational models is that:

"To conclude, an economist cannot be entirely happy with shortcut models such as the EPM. However, as we have pointed out in the past, EPM represents an acceptable compromise between consistent and economically founded modelling and operational character. There is certainly room to improve upon EPM but CPMM represents a step in the wrong direction. " (p.9)

3.5 Royal Mail's conclusions on the CPMM accord fully with those of Professors Cremer and De Donder. The geographical dimension which they emphasise and explain further in their comments is an important element in postal economics and in the EPM but much reduced within the CPMM. Also, like the EPM, the CPMM is an operational model whose general approach is tied to economic thinking and it is dependent necessarily on

the setting of parameter values and assumptions on phasing to generate projections of entry and hence of Royal Mail's projected volumes allowing for the effects of entry.

- 3.6 In their comments, Professors Cremer and De Donder set out briefly the requirements for a full economic model:

"To be able to predict the market outcome under various scenarios in a reliable and robust way, one would need to build a structural model of the industry. A first step would be a consistent specification of demand behaviour and an explicit modelling of the operators' strategies and the resulting market equilibrium. While the ultimate goal would still be to make numerical predictions the first step would be to understand how the industry works and how specific assumptions translate into results."(p.8)

Royal Mail believes a desirable goal of economic modelling of the postal sector would be to develop models towards the challenging requirements set out by Professors Cremer and De Donder and views this as an important part of the research agenda for the analysis of the economics of the postal sector.

Parameter Values in the CPMM

- 3.7 Some of the key parameter values in Frontier's model are set out between pages 32 and 41. The evidence to support these values, as is often the case, is limited and it needs to be accepted that best use should be made of whatever information is available. However, there are examples of cases where Frontier does not appear to have done this.
- 3.8 Frontier's parameter values on RM brand values are reported on page 38. The brand premium assumptions adopted in the CPMM suggest that no volumes would switch to a competitor unless the competitor offered a discount in excess of the brand premium parameter value. Table 1 reports the CPMM brand premium values for the period 2004/05 to 2010/11. These assume, for example, that if in 2005/06 year a competitor offered existing Royal Mail customers a service similar to that provided by Royal Mail but at a price that was 9% lower, not a single customer would take up the offer. This implies an assessment by Frontier that Royal Mail has significant brand value. However, the values are inconsistent with market research on customer switching behaviour undertaken by both Postcomm and Royal Mail.²³ For example, market research undertaken for Postcomm by Roland Berger Associates suggested that if an alternative supplier to Royal Mail offered a similar service but at a price that was 8% lower then 4% of existing customers would switch immediately and an additional 19% of customers would start negotiating a deal. In fact, the Roland Berger market research suggested that 3% would switch immediately and 16% would start negotiating a deal if the price difference was only 5%. These findings are inconsistent with the CPMM brand value assumptions and difficult to reconcile with Frontier's claim that the brand value assumptions *"were informed by the results of Roland Berger's 2004 survey"*. (p. 38)

²³ Research International, November 2003. *Estimating customer Switching Functions in a Liberalised Mail Market* and Postcomm, April 2004. *Monitoring developments in the postal market – market survey*. .

Table 1. CPMM Brand Premium Parameter Values

Brand Value Premium	
2004/05	0.100
2005/06	0.094
2006/07	0.088
2007/08	0.082
2008/09	0.077
2009/10	0.072
2010/11	0.068
2011/12	0.068

Source: Frontier Economics, CPMM

3.9 A second example relates to the parameterisation of CPMM’s switching functions which, as in the EPM, are a key element of the model and, as in the EPM, the CPMM has adopted a switching function with a cumulative normal distribution. The CPMM switching function, especially in the early part of the projection period, yields low levels of switching. In its report, Frontier states that it has used information from the Roland Berger study to inform the setting of the switching function. The CPMM switching function has used responses to Question 66 of the Roland Berger report. Frontier’s parameter values correspond to customers stating that they would switch immediately but it is not clear how the responses of those customers stating they would start to negotiate a deal or listen to an offer have been included. For example, even if only one-third of those stating they would start negotiating concluded a deal this would substantially raise the CPMM estimates of the proportion of mail switching from Royal Mail to competitors.

Table 2: Responses to Questions 66 of Roland Berger Survey

	Price differential (RM minus competitor)		
	5%	8%	10%
	% volume switching		
Switch immediately	3	4	9
Start negotiating	13	19	28
Listen to offer	46	48	43
Observe performance for some time	26	21	16
Ignore it	10	6	2
Don't know, no answer	3	2	2
Total	100	100	100

Source: Roland Berger Associates

3.10 It would be possible to go through most of Frontier ‘s parameter values in the same way and highlight the significant impact that plausible changes in many of these would have on the results from the model. Royal Mail considers it is important that, as with the EPM, sensitivity testing of individual parameters is undertaken and results of such exercises reported. Similarly, the results of simultaneous sampling of alternative groups of assumptions through Monte Carlo simulations would also provide insights into the range of possible outcomes. Neither type of sensitivity is reported by Frontier. Royal Mail believes that sensitivities should be tested in these ways and that the results of

such exercises should be an integral part of Postcomm's management of the risks associated with Royal Mail volumes.

- 3.11 A related area is the set of assumptions on the pace at which entrants will come into the market. These are set out on page 39 of Frontier's report. There is some information again from the Roland Berger Associates study but little evidence is produced on this very important set of assumptions to which Frontier's volume projections are highly sensitive. Royal Mail believes that sensitivities on the phasing assumptions should be undertaken and be an integral part of Postcomm's management of the risks associated with Royal Mail volumes.
- 3.12 More generally, the results emanating from the CPMM are very dependent on its assumptions. As the comments from Professors Cremer and De Donder make clear, it is as dependent, if not more, on these than the EPM and this is inevitable given the difficulty of making projections on competitive entry. As is the case with the EPM, Royal Mail believes it is essential to monitor, refine and update assumptions as information becomes available.

Results from the CPMM

- 3.13 Results from the CPMM are reported by Frontier on page 42 of its report. The CPMM, as parameterised for the results reported in table 8, projects roughly equal amounts of access and entrant bypass in all years. The model projects access volumes of 305m items in 2005/06, 1,002m items in 2008/09 and 2,085m items in 2010/11. Total entry to the market by 2010/11 is about 4bn items or about 20% of the total market as projected by Royal Mail (including additional net trend adjustments, rather than excluding them as proposed by Frontier).
- 3.14 Although Frontier's projection was published in June 2005, its projections for 2005/06 appear likely to be significantly adrift of prospective outturns for the year. In the first four months of 2005/06, access volumes rose sharply and totalled over 200m items with the July total at 78m items. If access volumes were to maintain their level in July for the rest of the year they would reach over 800m items for 2005/06 as a whole. However, they are expected to continue to increase further in the coming months and outturn at a figure much closer to Royal Mail's projection from the January 2005 BPQ, confirmed in Royal Mail's current response, of 1.3bn items. Conversely, the extent of entrant bypass appears to be less than projected by Frontier and again more in line with Royal Mail's projection of under 100m items for 2005/06. However, with regard to entrant bypass the position is less clear and measurement of the total size of the addressed inland letter market, which Postcomm has previously stated an intent to undertake, remains patchy.
- 3.15 The Frontier projections of volume as reported in its table 7 (page42) have been used in developing Postcomm's initial proposals for the price control. They are very similar to those reported in Postcomm's document (table 8.4).²⁴ The initial proposals contain four baskets within an RPI-X framework with values of X=3 (captive basket); X=2 (non-captive); X=6.9 (access); and X=3 (miscellaneous services). However, the prices used to determine Frontier's volume projection are not the same as those associated with these X values so that Frontier's volumes are not X-consistent. In particular, it seems quite

²⁴ The volumes for access are the same in the two documents although there are slight differences between the volumes reported for the end-to-end products.

implausible that if access prices were to decline by 5% per annum for several years relative to the presort products in Postcomm's proposed "non-captive" basket, many of which are close substitutes to access, that access would be only 10% of market volumes.

- 3.16 Although Frontier comments on this point in its report, the accuracy, robustness and indeed, relevance of its volume projections are highly questionable. In the short term the projection appears to be significantly adrift from prospective outturns for 2005/06 with access volumes heavily understated and entrant bypass probably overstated. Over the longer term the volume projections are inconsistent with the X-values in Postcomm's initial proposals document. However, it is not clear that there exists a set of volume shares which would be consistent with the prices Postcomm has proposed in its initial proposals and if there were the volume profile would be likely to be substantially different to that reported by Frontier.

Concluding Comments on Frontier Economics' Work on "Volume Shares"

- 3.17 The CPMM, like the EPM, is an operational model. As the comments of Professors Cremer and De Donder make clear, the CPMM has no qualification to being considered as an economic model and it is in their view a step in the wrong direction in terms of the development of operational models. As they also make clear, the geographical dimension of competition which is an important component of the postal economy is much reduced within the CPMM.
- 3.18 The CPMM depends on a number of key parameters and as with all models of this type, including the EPM, it is critically dependent not only on the structure of the model but also on the values assigned to these parameters. This is a difficult area but, as Royal Mail's response has shown, information used by Frontier could have been applied quite differently in a number of cases reviewed and this point applies more generally. The reporting of sensitivities of key parameter values both individually and jointly through Monte Carlo simulations would improve the transparency of the CPMM and understanding of the impact of alternative values for key parameters in the model. Royal Mail believes that the results of such exercises should be a key element and integral part of Postcomm's management of volume risk.
- 3.19 The projections presented by Frontier in its report appear likely to be significantly different from outturn for 2005/06. For the years of the price control, the prices used by Frontier were different to those proposed by Postcomm as part of initial proposals document. Royal Mail agrees with Frontier's conclusion (page 44) that all of the volume projections required for the price control need to be updated and made internally consistent when Postcomm presents its final proposals on the price control. Accordingly Royal Mail believes that the volume projections consistent with Postcomm's final proposals will be substantially different to those contained in Frontier's report.
- 3.20 Royal Mail believes that Postcomm's initial proposals for the price control are based on a set of volumes prepared by Frontier which is completely inconsistent with its proposed prices. The interaction between prices and volumes can be expected to have a material impact on the value of X and hence on projecting a set of volumes which is consistent with prices proposed in the control. This is particularly so in the case of the multiple basket structure proposed by Postcomm when combined with significant changes in relative prices between baskets, most notably between access and presort products. As a result, Royal Mail believes that one key element of a viable set of proposals is

completely lacking; namely a set of volumes expected to be consistent with the prices set by Postcomm which deliver the allowed revenue in its proposals. Royal Mail believes this weakness undermines the credibility of Postcomm's initial proposals for the price control.

Royal Mail
August 2005