



Retail Zonal Pricing Review

Response to Royal Mail Letter dated 17 July 2007

25 October 2007

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Glossary

The following abbreviations are used in this report:

BD	Business density
DO	Delivery office
DPD	Delivery point density
IMC	Inward mail centre
LECG Report	"Retail Zonal Pricing Review – Analysis of Zonal Costs" dated 4 July 2007
MC	Mail centre
PCR	Price Control Review
Postcomm/PSC	The Postal Services Commission
Royal Mail Letter	Letter from Royal Mail to Postcomm dated 17 July 2007
ZCM file	"ZonalCostingTemplate05_06.xls"

1 Summary

- 1.1 On 20 February 2007, Royal Mail submitted a revised application for zonal pricing. To support Postcomm's consideration of the application, LECG was asked to assess the economic justification for zonal postal prices, and to consider how delivery costs differed by postal zone. We found, among other things, that unit costs at delivery offices ("DO") in zones A and B were not significantly different, from a statistical perspective.
- 1.2 In a letter dated 17 July, Royal Mail commented on the statistical methods used by LECG, and in particular, commented on the finding that unit costs in zones A and B were not significantly different. Royal Mail argued that the statistical tests run by LECG did not take into account the importance of mail volumes in determining unit costs in the two zones. They argued that the average cost faced by an item for delivery in zone A was [REDACTED] and that the average cost faced by an item for delivery in zone B was [REDACTED]. They stated that this difference was sufficient to support having separate zones A and B.
- 1.3 Royal Mail was not particularly clear as to why they think our approach was wrong. They have supplied graphs showing unit costs and volumes in zones A and B, together with a cumulative curve of unit costs versus traffic. Taken together, this evidence does not undermine the work we have performed, nor does it provide persuasive support for separating zones A and B. We have considered Royal Mail's response. However, we still believe that our statistical testing procedure is valid. From a purely statistical point of view, the unit costs at DOs in zones A and B are not different.
- 1.4 We acknowledge that the unit costs estimated by the ZCM for zones A and B are different in absolute terms. To determine why there is no statistical difference, we have analysed the distributions of unit costs in zones A and B. Our main finding is that there is a significant overlap between the unit costs in zone A and B (i.e. many DOs in zone A have the same unit costs as DOs in zone B). This is why our statistical tests fail to find a significant difference.
- 1.5 We also found that the difference in unit costs in absolute terms is due to the presence of outliers. Specifically, there are six DOs which account for 56% of zone A volumes. These DOs have very low unit costs, because (with the

exception of one) they are very close to, or on the efficiency frontier. Due to high volumes and low unit costs, these DOs have a significant impact on average unit costs. Nevertheless, the remaining 11 zone A DOs have characteristics that are more closely aligned to zone B DOs.

- 1.6 This finding raises an additional and important concern. The outlying six zone A DOs represent approximately half of the zone A postcode sectors in the 17 zone A DOs, but only 10.5% of all zone A postcode sectors. We have considered whether prices in 761 postcode sectors should be based on unit costs estimated on a sample of 153 sectors, half of which belong to DOs that are outliers and are (with the exception of one) highly efficient. The evidence suggests that this would be inappropriate. We found that zone A postcode sectors in zone B and C DOs do not have the same characteristics as the large outlying zone A DOs. Importantly we found that the estimated unit costs at DOs in zones B and C are higher when the DOs contain zone A postcode sectors. Based on Royal Mail's claims, we would expect these costs to be lower. This supports our findings that, outside of the outlying group of DOs, zone A costs are not necessarily lower than zone B costs.

2 Background

Introduction

- 2.1 Royal Mail's licence provides for the possibility of it applying to charge mail senders different prices according to the geographic location of mail recipients (zonal pricing). This provision, set out in Condition 21 ("Prices for Postal Services"), paragraphs 17 to 19 ("Geographic Price Uniformity") of Royal Mail's licence, explicitly excludes those products that are subject of the Universal Service Obligation from zonal pricing.
- 2.2 On 5 July 2006, Royal Mail submitted an application to Postcomm to be allowed to introduce zonal pricing for certain bulk products, which are used by the largest mailers (e.g. banks, utilities, government, charities and advertisers)¹. Under Condition 21 of Royal Mail's licence, Postcomm is required to assess whether the proposed changes will, among other things, lead to prices being more reflective of costs than they would be if the existing geographically uniform prices were retained.
- 2.3 On 20 February 2007, Royal Mail submitted a revised application for zonal pricing, accompanied by a supporting model and documentation. Postcomm performed an assessment of Royal Mail's zonal pricing application. As a part of that assessment, Postcomm asked LECG to assess the economic justification for zonal postal prices, and to consider how delivery costs differ by postal zone.
- 2.4 Our initial conclusions are set out in our report "Retail Zonal Pricing Review – Analysis of Zonal Costs" dated 4 July 2007. We refer to this report hereinafter as the "LECG Report".
- 2.5 One component of our analysis involved testing whether the zonal costs produced by Royal Mail were statistically different between zonal pairs. We have found evidence that average unit costs differed across all zones except between zones A and B.
- 2.6 In a letter dated 17 July 2007, Royal Mail commented on the statistical methods used in the LECG Report. We refer to this letter hereinafter as the "Royal Mail

¹ The products covered by Royal Mail's application are Mailsort 120 (first and second class, OCR and CBC); Mailsort 700 (first, second and third class); Mailsort 1400 (third class); Presstream (first and second class); and Walksort (first and second class).

Letter”. This report provides LECG’s response to the comments raised in the Royal Mail Letter².

- 2.7 Our response is set out as follows. First, we summarise our initial conclusions, to provide context to our response. Then we summarise the points raised in the Royal Mail Letter. In the next section, we then address Royal Mail’s points. In the final section, we summarise our conclusions.

Initial conclusions

- 2.8 The LECG Report provides an assessment of whether Royal Mail’s zonal pricing application is more cost reflective than the current geographically uniform pricing structure. In its zonal pricing application, Royal Mail identified five postal zones. It assigned all postcode sectors³ in the UK to one of these postal zones. Four of the five postal zones were defined based on delivery point density (“DPD”) and business density (“BD”), while the fifth postal zone was London. The five zones are shown in the table below.

Table 1: Postal zones

Zones	Business Density	Delivery Point Density
L – London	N.A.	N.A.
A – Business District	> 10%	> 500 per km ²
B – High Density	N.A.	> 1,000 per km ²
C – Average Density	N.A.	> 100 per km ² and ≤ 1,000 per km ²
DE – Low Density	N.A.	≤ 100 per km ²

Source: Royal Mail, Zonal Pricing Modified Application, 20 February 2007.

- 2.9 With zonal pricing, all qualifying mail addressed to postcode sectors in a certain postal zone will be charged the same price. This price must be cost reflective, and the ZCM estimates the unit costs of delivering mail in each postal zone, using Delivery Office costs as a proxy for postcode sector costs. Each DO has a

² In this response, we only consider delivery office costs, as statistical and econometric tests were performed on these costs. Similar statistical tests were not performed on mail centre costs.

³ A postcode sector is the area represented by the first four characters of a postcode. Therefore, if the postcode is OX4 1QD, the corresponding postcode sector is the area identified by the characters OX4 1.

collection of postcode sectors belonging to different zones. Royal Mail uses DO costs as a proxy because it does not have postcode-sector level cost data.

2.10 The ZCM estimates zonal unit costs by allocating top-down input costs from Royal Mail's costing systems, and revenue based traffic measures, to DOs and postal zones within inward mail centres ("IMCs")⁴. Each DO is assigned to a single postal zone, using the criteria shown in Table 1 above⁵. The ZCM then sums the allocated costs and volumes of all DOs assigned to a given zone, and the ratio between these costs and volumes represents the estimated unit cost of mail delivery in each zone.

2.11 For example, there are 17 DOs that are assigned to zone A and their unit costs are used to set zonal prices for the 761 zone A postcode sectors in the UK⁶. It is important to note that the DOs assigned to zone A contain a collection of postcode sectors, but zone A postcodes predominate. In the LECG Report we accepted Royal Mail's approach but concluded:

"...it remains that using an audited, more disaggregated dataset (i.e. such as cost and volume data derived at a DO, IMC or postcode sector level) rather than allocating top-down costs might yield different zonal results. We have been unable to evaluate the degree to which these results might differ".⁷

2.12 Table 2 below shows the unit costs calculated by the ZCM.

⁴ The ZCM estimates delivery costs for five pipeline activities: local distribution to DO, DO indoor delivery staff, DO outdoor delivery staff, DO outdoor vehicles, DO other delivery, and IMC sorting.

⁵ For example, the ZCM would assign a DO that has DPD of 2,400 and BD of 0.11 to zone A. It would assign a DO that has DPD of 2,400 and BD of 0.10 to zone B.

⁶ Refer to Chapter 3 of the LECG Report for further details on Royal Mail's methodology.

⁷ LECG Report, paragraph 1.17.

Table 2: Original ZCM results – Unit delivery costs

Zones	IMC	DO	Total
London	████	████	████
A	████	████	████
B	████	████	████
C	████	████	████
DE	████	████	████
Total	████	████	████

Source: ZCM file.

2.13 We tested whether the zonal costs produced by the ZCM were statistically different between zonal pairs⁸. To perform this standard test, we computed unit costs for each DO⁹. Having the unit costs for 1,375 DOs allowed us to obtain a distribution of unit costs by zone¹⁰. We then tested statistically whether the average of these unit costs varied by zone. We found evidence that average unit costs differed across all zones except between zones A and B¹¹.

2.14 In drawing our conclusions from the statistical testing, we made two qualifications:

“First, and generally speaking, when performing statistical tests the size of the samples used is important. The smaller the sample, the higher the differences between two means must be in order for the test to find that they are different. Also, the higher the variability (the variance) in the data, the easier it is to find no statistical difference. The tests we performed were geared to assess whether the underlying distributions of unit costs differ. We found that in most cases they do (e.g. even in almost all cases involving small sample sizes, such as zone A..., which points to strong results). In only two instances, we found no statistical difference...”

⁸ That is, we tested whether unit costs in all pairs formed by one zone and each other zone were statistically different. With five postal zones, there are ten such zonal pairs.

⁹ When we refer to unit costs at a DO, we mean the ratio between top-down costs and volumes allocated to that DO.

¹⁰ Refer to paragraphs 6.4 to 6.7 of the LECG Report for further details on this methodology.

¹¹ Refer to paragraph 6.26 and Table 22 of the LECG Report for further details.

Second, statistical significance is different from actual significance... Whether one wants to rely on statistical results or factual figures in defining the optimal zonal classification is a matter of policy.”¹²

- 2.15 We also performed econometric tests, to support the results of the statistical analysis. The econometric analysis tested whether there was evidence that zonal differences in unit costs across postal zones were driven by geography. Specifically, we tested whether *total* costs varied across zones, after having allowed for the impact of mail volumes and factor prices¹³. We found no evidence to suggest that zone A had an impact on total costs. What makes zone A different from zone B and C is the proportion of BD¹⁴. The econometric results suggested that this definition is not correct, because increasing the proportion of postcode sectors in A did not have a significant impact on DO costs. However, increasing the proportion of postcode sectors in B or C did. This suggested that there was a need to adjust the DPD threshold for zone A, or the BD threshold, or both. An alternative interpretation is that, when considering costs at the DO, rather than the postcode sector level, BD is not a relevant cost driver, which might be why the zonal cost variable A is not significant.
- 2.16 Our econometric analysis supported our statistical analysis. Overall, we concluded that there is no evidence that DO unit costs in zones A and B differ. We found that the costs of delivering mail were not uniform, but we could not say with confidence whether the zonal classifications proposed by Royal Mail were better than alternative definitions¹⁵.

Royal Mail comments

- 2.17 Royal Mail's response to our analysis is contained in the Royal Mail Letter. Royal Mail states:

“Regardless of the potential relevance of the LECG report to the review of our application, Royal Mail has carefully reviewed the

¹² LECG Report, paragraphs 1.30 and 1.31.

¹³ Refer to paragraphs 7.1 to 7.8 of the LECG Report for further details on the econometric methodology.

¹⁴ See Table 1. We note that, of the 17 DOs that are classified as zone A, 16 have DPD larger than 1,000 and would be classified as zone B but for the value of BD. Only Sheffield East DO, with DPD of 713, would be classified as zone C but for the value of BD.

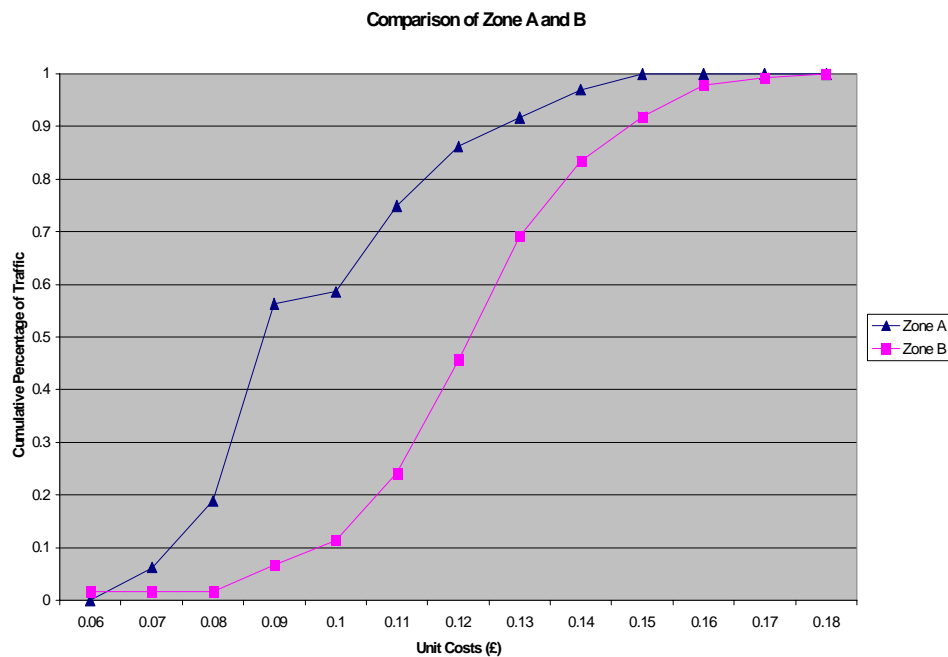
¹⁵ We refer to the Conclusions of Chapters 6 and 7 of the LECG Report for further details on our findings.

*extract provided by Postcomm and our concerns about the analysis are set out below. The important omission in this analysis is that it does not take explicit account of the distribution of volumes of mail delivered at each DO in each zone. In order to set nationally applicable prices based on costs it is necessary to consider the average cost of all relevant items. In practice this will consist of averaging out the costs associated with many different locations and routes through the network, and these averages will include the relevant mail volumes as part of the calculation. In this case, once the volume distribution is included then we determine - as shown in the Zonal Cost Model - that the **average** cost faced by an item for delivery in zone A is [REDACTED] and that the **average** cost faced by an item for delivery in zone B is [REDACTED]. It is these figures which are the relevant ones and which drive the distinction between zones and Royal Mail would contend that this is sufficient difference to support having separate zones A and B. The LECG analysis does not support merging zones A and B because it excludes the critical element of calculating the average cost per item."*

- 2.18 We understand from this that Royal Mail believes that our statistical methodology is inappropriate. Royal Mail has computed the unit cost of delivery as the ratio between costs and volumes summed over all the DOs assigned to a particular zone. This is a weighted average, where each DO is assigned a weight that is proportional to its importance in terms of volume contribution. This is what we understand is meant by "*taking explicit account of the distribution of volumes of mail delivered at each DO in each zone.*" For example, total mail volumes at the 17 zone A DOs were [REDACTED]. With mail volumes of [REDACTED] the unit cost at Newcastle Upon Tyne City DO (a DO that is assigned to zone A) had a volume weight of 8.1%. Total mail volumes in zone B were [REDACTED]. With mail volumes of [REDACTED], the unit cost at the Shirley DO had a volume weight of 1.4% in the computation of zone B unit costs.
- 2.19 To illustrate the argument further, Royal Mail provided a chart that contained a comparison of unit costs at zone A and zone B (shown below). They indicated

that this “clearly shows the difference in cost distributions once volumes are accounted for”¹⁶.

Figure 1: Royal Mail comparison of Zone A and B unit costs



Source: Royal Mail Letter.

2.20 The chart shows that 56% of mail volumes in zone A DOs are delivered at DOs with unit costs of less than £0.08, against less than 10% of volumes in zone B DOs. Royal Mail argues that, once account is taken of individual volume contributions, unit costs at DOs in zone A are lower than unit costs at DOs in zone B. Royal Mail’s argument suggests that one should look at this aggregate number, rather than at the underlying distribution of costs at individual DOs.

2.21 Whilst this chart is visually appealing, it tells us nothing about the composition of unit costs. In particular, the chart does not show how many DOs account for that 56% of total volumes, and whether these DOs have similar characteristics to other DOs in zone A, or whether they are outliers. It does not explain whether on average individual DOs in zone A are different from individual DOs in zone B.

¹⁶ Royal Mail Letter.

2.22 The statistical tests performed by LECG look at unit costs incurred by individual DOs in zone A versus other zones, and tests whether these costs are different on average. Royal Mail's comments appear to relate to the use of this statistical test, with particular emphasis on the results for zone A versus B. Royal Mail does not comment specifically on the results of our econometric analysis.

3 Response to Royal Mail's comments

Introduction

- 3.1 In this section, we provide our response to the comments raised by Royal Mail. We first discuss the rationale for the standard statistical tests that were used in the LECG Report. Second, we analyse the cost distributions in zones A and B to see why the statistical tests fail to find a significant difference between the two zones. Third, we identify further reasons why having a separate zone A may be inappropriate.

Rationale for LECG statistical tests

- 3.2 The ZCM computes unit costs by weighting those DOs that have higher volumes more heavily. This is the correct way of accounting for the distribution of volumes when estimating unit costs. However, when applying weights this way – no matter how correctly - there are dangers that values recorded in some DOs will have a disproportionate impact on the estimate of zonal unit costs¹⁷. The impact of these DOs would be stronger, *inter alia*, the smaller the number of DOs assigned to that zone. This is the case for zone A, which has only 17 DOs.
- 3.3 The following example, shown in the table below, helps to clarify the issue. Assume that there are two postal zones with ten DOs in each. Assume further that nine DOs are the same across zones (in terms of volumes and unit costs), but one is different (e.g. DO 1). Looking at the average unit costs in the two zones, one might conclude that the zones are different. The average unit cost in zone 1 is █████. In zone 2, it is █████ (i.e. there is a difference of 11%).

¹⁷ This would be the case if a few DOs had much higher (or lower) volumes and a significantly different unit cost.

Table 3: Impact of a large DO on estimation of the unit cost

DO	Zone 1		Zone 2	
	Volume	Unit cost	Volume	Unit cost
1	59,872,512	■	14,192,070	■
2	28,545,842	■	28,545,842	■
3	32,645,967	■	32,645,967	■
4	15,802,159	■	15,802,159	■
5	33,897,990	■	33,897,990	■
6	11,567,269	■	11,567,269	■
7	8,433,854	■	8,433,854	■
8	10,648,954	■	10,648,954	■
9	15,023,115	■	15,023,115	■
10	25,300,402	■	25,300,402	■
Average unit cost		■	■	

Source: LECG simulations.

- 3.4 A closer look at the individual DOs, however, shows that they are almost the same (i.e. nine DOs have exactly the same unit costs). If we looked at the distributions of DOs in the two zones, we would conclude that they are the same (statistically). Hence, it is important to test whether the estimated difference in unit costs reflects a difference in the underlying distribution of costs, or whether it simply reflects the impact of one observation (i.e. DO 1 in zone 1). This observation may have peculiar characteristics (i.e. it is an outlier). The statistical tests carried out in the LECG Report address this particular point.
- 3.5 It is important to consider whether the presence of outliers could bias the zonal results. We believe that they could. This is because the ZCM computes zonal unit costs based on DO costs, whilst zonal pricing applies to mail delivered at a postcode sector level. The table below shows the example of the Nottingham City DO, which is assigned to zone A. This DO comprises 14 postcode sectors, seven of which are zone A and seven of which are zone B. Mail addressed to the seven

zone A postcode sectors will be charged zone A prices, while mail addressed to the seven zone B sectors will be charged zone B prices. The costs and volumes of the Nottingham City DO are used by the ZCM to compute zone A, not zone B, unit costs.

Table 4: Nottingham City DO

Postcode Sector	DPD	BD	Zone
NG1 1	6,112	18%	A
NG1 2	3,673	92%	A
NG1 3	6,232	45%	A
NG1 4	2,462	11%	A
NG1 5	2,806	35%	A
NG1 6	2,953	62%	A
NG1 7	1,625	84%	A
NG3 1	4,571	8%	B
NG3 2	2,827	6%	B
NG3 3	3,218	1%	B
NG3 4	2,405	6%	B
NG3 5	1,536	5%	B
NG3 6	1,674	1%	B
NG3 7	1,588	3%	B
Whole DO	2,302	11%	A

Source: ZCM file.

- 3.6 As each DO contains postcode sectors that belong to different postal zones, the unit costs produced by the ZCM are estimates of what the true unit costs of delivering mail to a postcode sector in a certain postal zone would be. The table below shows the extent to which postcode sectors vary across DOs assigned to each zone.

Table 5: DOs and postcode sectors by zone. UK excluding Greater London

Zone	DOs	Proportion of postcode sectors by zone			
		A	B	C	DE
A	17	20.1%	2.0%	0.4%	0.0%
B	151	15.4%	39.4%	6.6%	0.9%
C	572	53.9%	53.8%	78.2%	36.8%
DE	428	10.6%	4.8%	14.7%	62.3%
Total No.	1,168	761	2,431	2,618	2,525

Source: LECG calculations based on data from ZCM file.

3.7 The data shows, for example, that 78.2% of all zone C postcode sectors can be found within DOs classified as zone C. The proportion of zone B postcode sectors located within zone B DOs is 39.4%. Only 20.1% of zone A postcode sectors are in zone A DOs (i.e. only 153¹⁸ of the 761 zone A postcode sectors are located in DOs assigned to zone A, while the remaining 608¹⁹ postcode sectors are not).

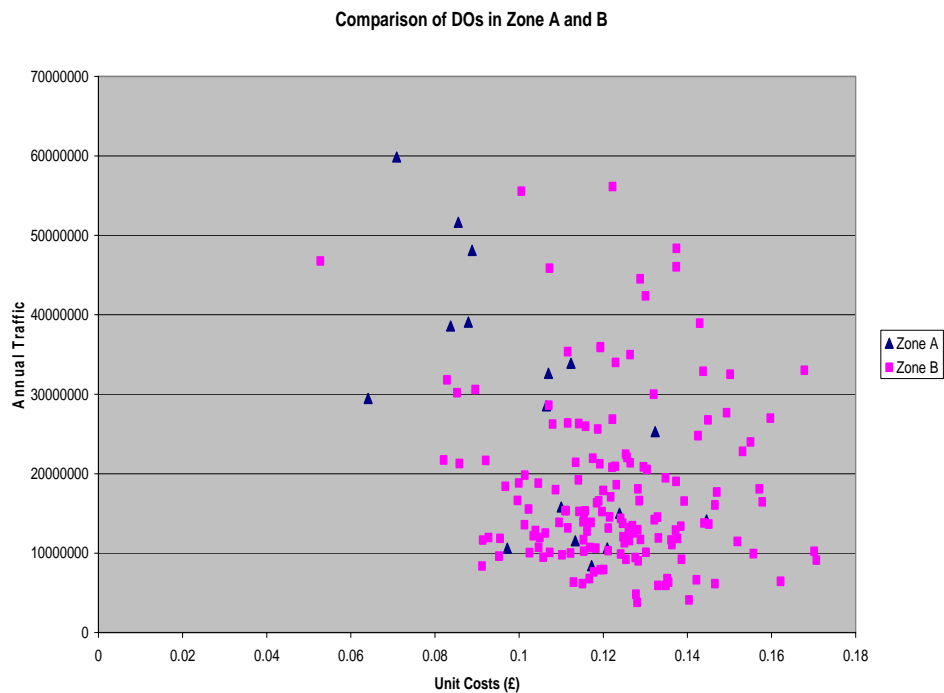
3.8 Hence, zone A has a much smaller proportion of same-zone postcode sectors than do other DOs (i.e. 20.1% for zone A against 39.4% for zone B, etc). Zone A's small sample size (i.e. 17 DOs), also makes the estimated unit costs very sensitive to the impact of very large DOs (i.e. DOs with particularly high volumes). Against this background, it is important to test whether the typical DO in zone A has unit costs that differ statistically from a typical DO in another zone. In doing so, we are testing whether the results can be applied to the remaining 608 postcode sectors without any bias. This is what we did in the LECG Report.

Cost distributions in zones A and B

3.9 The statistical tests performed in the LECG Report failed to find a significant difference between unit costs in zones A and B. We have recomputed these tests, confirming our initial conclusions. In this section, we analyse the cost distributions between the two zones, to provide some intuition behind the results.

3.10 The unit costs of zone A and B DOs are plotted in Royal Mail's graph called "A compared to B Chart", which was embedded in Royal Mail's Letter. We reproduce this chart below. Royal Mail Letter explains that this chart "clearly shows that zone A offices generally have larger volumes."

Figure 2: Royal Mail comparison of Zone A and B unit costs



Source: Royal Mail Letter.

3.11 The chart illustrates two things. First, while there appears to be an inverse relationship between unit costs and volumes in zone A DOs (the blue triangles), this relationship is absent for zone B DOs (the pink squares). Correlation analysis confirms this. The correlation coefficients between unit costs and volumes are minus 0.68 for zone A and minus 0.09 for zone B. This result is puzzling, and we believe that it is sensible to consider what drives this difference.

3.12 The second thing we notice is that 11 of the 17 zone A DOs are entirely contained within the cloud represented by the zone B DOs. In other words, there is an

¹⁸ 20.1% of the 761 zone A postcode sectors.

¹⁹ 761 zone A postcode sectors minus 153 sectors that are in zone A DOs is equal to 608 zone A postcode sectors located in the other postal zones.

overlap in the unit cost distributions for zone A and B. This is what the statistical tests pick up.

- 3.13 A number of DOs are located to the left of the cloud. These DOs have lower unit costs. There are six DOs in zone A, and six in zone B (the “six zone A” and “six zone B” DOs henceforth) that have unit costs of less than [REDACTED]. Once the six zone A DOs are excluded from the 17 DOs classified as zone A, any appearance of a relationship between unit costs and volumes disappears, and the correlation coefficient falls to minus 0.15. Therefore, any relationship between unit costs and volumes in zone A appears to be driven by the effect of those six DOs. It also suggests that there are 11 DOs in zone A that are more similar to zone B DOs. Moreover, the weighted average unit cost in the remaining 11 DOs is [REDACTED] or [REDACTED] higher than the [REDACTED] estimate obtained from the ZCM. By comparison, the weighted average unit cost in zone B DOs, after taking out the six zone B DOs is [REDACTED] [REDACTED] or [REDACTED] higher than the [REDACTED] estimate obtained from the ZCM.
- 3.14 The impact of the six DOs is much stronger for zone A DOs than for zone B. This is what one would expect, given the differences in sample sizes. The six zone A DOs have a combined volume weight of 56% in the computation of zone A costs, in comparison to the combined volume weight of 7% for the six zone B DOs. Once the twelve DOs are removed, unit costs in zones A and B are no longer as different as before: the unit cost difference between zones A and B goes from [REDACTED].
- 3.15 One possible explanation for lower unit costs is higher volumes. This explanation, however, seems to be only valid for the six zone A DOs. There is no relationship between unit costs and volume in zone B (see paragraph 3.11).
- 3.16 The second possible explanation is higher efficiency. This is something that can be tested given that we have efficiency measures from the Price Control Review (“PCR”)²².
- 3.17 The table below shows that the DOs with the lowest unit costs, independently of whether they are zone A or B, are highly efficient, the sole exception being Leeds

²⁰ That is, [REDACTED] in zone B minus [REDACTED] in zone A.

²¹ That is, [REDACTED] in zone B minus [REDACTED] in zone A.

²² LECG, Future Efficient Costs of Royal Mail’s Regulated Activities, 2 August 2005. Efficiency estimates are based on 2003/2004 data.

City DO. The inefficiency score measures the percentage of total DO labour costs that are attributable to inefficiency. Only Leeds City has a high inefficiency score. All the others are either 100% efficient or lie very close to the efficiency frontier. Two DOs in zone B, Great Barr and South West (M) have no inefficiency score because they were eliminated from the analysis performed during the PCR due to data concerns.

Table 6: DOs with low unit costs, zones A and B

DO Name	Zone	Volume	Unit cost	Inefficiency score
Glasgow G1 - G4	A	████████	██	0.0%
Newcastle upon Tyne City	A	████████	██	0.0%
Bristol 1	A	████████	██	0.0%
Leeds City	A	████████	██	17.2%
Cardiff	A	████████	██	0.0%
Manchester	A	████████	██	0.9%
North Tyneside	B	████████	██	0.0%
Great Barr	B	████████	██	na
Redfern Park	B	████████	██	0.0%
South West (M)	B	████████	██	na
Salford	B	████████	██	0.0%
South East (M)	B	████████	██	3.2%

Source: LECG calculations based on data from ZCM file, and LECG results from the PCR (based on Royal Mail's 2003/4 data).

3.18 In conclusion, because the number of zone A DOs is very small (17), the presence of a small number of DOs that appear to be outliers has the effect of reducing the unit costs estimated by the ZCM. These six, efficient DOs are responsible for 56% of zone A volumes. As a result, they have low unit costs and a high volume weight, which drives most of the difference between unit costs in zone A and B. This is why Royal Mail concludes that *“the average cost faced by an item for delivery in zone A is ██████████ and that the average cost faced by an*

item for delivery in zone B is [REDACTED]²³. However, our statistical test accounts for the overlap between DOs in the two zones, and for the distribution of unit costs across the 17 DOs. There is considerable overlap between DOs in the two zones. This, coupled with the small sample size, prevents the test from finding a significant difference between zones A and B.

Reasons for concern

3.19 The six zone A DOs shown in Table 6 represent approximately half of the zone A postcode sectors in the 17 DOs, but only 10.5% of all zone A postcode sectors. In our view, there is an important question here with respect to zone A, and that is whether one should allow pricing in 761 postcode sectors based on unit costs estimated on a sample of 153 sectors, half of which belong to DOs that are very large, and are (with the exception of one) highly efficient. It is important to consider, therefore, if the 608 zone A postcode sectors not belonging to zone A DOs present characteristics that are similar, in terms of unit costs, to zone A DOs.

3.20 We have considered whether DOs have different costs when there are zone A postcode sectors in their territory. If they do not, then it would be difficult to justify that there are large differences in unit costs between zones A and B. To consider whether unit costs at DOs in zones B, C, and DE differ according to whether these DOs have zone A postcode sectors in their territory, we have computed separate unit costs for the DOs that have, and do not have, zone A postcode sectors in their territory. We would expect to find DOs with zone A postcode sectors to have lower unit costs than DOs without. However, we do not find this to be the case. This supports our original conclusions. Our findings are summarised below:

- there are 117 postcode sectors classified as zone A located in 65 zone B DOs. In total there are 151 zone B DOs. Unit costs are [REDACTED] for zone B DOs with zone A postcode sectors and [REDACTED] for zone B DOs without;
- there are 410 postcode sectors classified as zone A located in 239 zone C DOs. In total there are 572 zone C DOs. Unit costs are [REDACTED] for zone C DOs with zone A postcode sectors and [REDACTED] for zone C DOs without; and
- there are 81 postcode sectors classified as zone A located in 71 zone DE DOs. In total here are 428 zone DE DOs. Unit costs are [REDACTED] for zone

²³ Royal Mail Letter.

DE DOs with zone A postcode sectors and [REDACTED] for zone DE DOs without.

- 3.21 In summary, zone B and C DOs with zone A postcode sectors have higher, not lower unit costs than DOs without²⁴. Thus, 527²⁵ zone A postcode sectors – representing about 70% of all zone A postcode sectors²⁶ – are located in DOs that have higher unit costs than corresponding DOs without zone A postcode sectors. This suggests that the presence of zone A postcode sectors within DOs results in higher unit costs (at least in zone B and C DOs), not lower costs as expected given Royal Mail's assertions.
- 3.22 This result supports our findings that zone A and zone B costs are not different (or at least zone A costs are not lower than zone B costs). It also raises concerns about the suitability of DO-based unit costs to estimate postcode sector costs in zone A. Estimated unit costs in zone A DOs are heavily influenced by the presence of six large DOs, which have low unit costs. We found however, that estimated unit costs at DOs in zones B and C are not lower when the DOs include zone A postcode sectors. This implies that the zone A postcode sectors in zone B and C DOs, do not have the same characteristics of the large zone A DOs. If they did, their unit costs would be lower than DOs without zone A postcode sectors.

²⁴ DOs with zone A postcode sectors do have higher mail volumes. Average mail volumes at DOs with zone A postcode sectors are 22.7m for zone B, 28.0m for zone C, and 17.5m for zone DE. In comparison, average mail volumes at DOs without zone A postcode sectors are 14.5m for zone B, 11.8m for zone C, and 6.9 m for zone DE. While for DOs in zones B and C there appears to be a positive relationship between volumes and the presence of zone A postcode sectors, there is no correlation between these high volumes and lower unit costs.

²⁵ That is 117 in zone B plus 410 in zone C.

²⁶ 527 represents 69.3% of 761.

4 Conclusions

- 4.1 We believe that our statistical testing procedure is valid. From a purely statistical point of view, we have considered whether unit costs in zones A and B are different. Weighted average zonal unit costs estimated at the DO level might be different in absolute terms, but this difference is driven by the presence of a few outlying observations (i.e. very large DOs with very low costs). Hence, we have tested the null hypothesis that the unit costs in the two sets of DOs (i.e. DOs in zones A and B) come from the same distribution (i.e. have the same mean). This is a standard statistical test. We have reperformed our calculations and find that unit costs do not differ between zone A and B.
- 4.2 Royal Mail was not particularly clear as to why this approach was wrong. Rather, they have supplied graphs showing unit costs and volumes in zones A and B, together with a cumulative curve of unit costs versus traffic. Taken together, this evidence does not undermine the work we have performed, nor does it provide additional support for separate zones A and B.
- 4.3 We have investigated the distributions of unit costs in zones A and B to determine their main characteristics. We found that there is an overlap between the unit costs of DOs in zone A and B. This is why our statistical tests failed to find a significant difference. We also found that the difference in unit costs in absolute terms is due to the presence of outliers, which have higher volumes and are more efficient. Specifically, there are six zone A DOs, which account for 56% of zone A volumes. These DOs have very low unit costs, because (with the exception of one) they are very close to, or on, the efficiency frontier. The remaining DOs have characteristics that are more closely aligned to zone B DOs.
- 4.4 This finding raises an additional and important concern. The outlying six zone A DOs represent approximately half of the zone A postcode sectors in the 17 DOs, but only 10.5% of all zone A postcode sectors. We have considered whether prices in 761 postcode sectors should be based on unit costs estimated on a sample of 153 sectors, half of which belong to DOs that are outliers and are (with the exception of one) highly efficient. The evidence suggests that this would be inappropriate. We found that zone A postcode sectors in zone B and C DOs do not have the same characteristics of the large outlying zone A DOs. Importantly, we found that the estimated unit costs at DOs in zones B and C are higher when

they contain zone A postcode sectors. Based on Royal Mail's claims, we would expect these costs to be lower. This supports our findings that, outside of the outlying group of DOs, zone A costs are not necessarily lower than zone B costs.