



Review of Australia Post's volume and input cost forecasts

A REPORT PREPARED FOR THE ACCC

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Executive Summary	iii
1 Introduction	1
1.1 Background	1
1.2 Process of this review	3
1.3 This report	3
2 Volume forecasts	5
2.1 Background	5
2.2 Baseline forecasts derived by Diversified Specifics	6
2.3 Forecasts derived by Australia Post	12
2.4 Conclusions	17
3 Cost forecasts	19
3.1 Introduction	19
3.2 Information supplied by Australia Post	19
3.3 Cost structure and forecasts	20
3.4 Input cost forecasts	21
3.5 Relationship between costs and volumes	25
3.6 Conclusions on cost forecasts	28
4 References	30

Review of Australia Post's volume and input cost forecasts

Figures

Figure 1: Small letters – Diversified Specifics' forecasts	11
Figure 2: Large letters – Diversified Specifics' forecasts	11
Figure 3: Other small letters – Australia Post's forecasts	15
Figure 4: Pre-sort small letters – Australia Post's forecasts	16
Figure 5: Other large letters – Australia Post's forecasts	16
Figure 6: Pre-sort large letters – Australia Post's forecasts	17
Figure 7: Domestic reserved letters – volume, revenue and cost forecasts	20
Figure 8: Forecast cost base for reserved services, by type of cost	21
Figure 9: Comparison of changes in volumes and costs (deflated by CPI) for reserved services	21
Figure 10: Reserved service labour costs and FTEs, actual and forecast	23
Figure 11: Australia Post's labour prices	23
Figure 12: Forecast FTEs	23
Figure 13: Contractor costs and volumes – reserved services	24
Figure 14: Depreciation – actual and forecast across reserved and aggregate services	25

Tables

Table 1: Letter volume demand – Small letters	14
Table 2: Letter volume demand – Large letters	14

Executive Summary

Frontier Economics (Frontier) has been engaged by the Australian Competition and Consumer Commission (ACCC) to provide an independent assessment of the demand and input cost forecasts used by Australia Post in its April 2010 Price Notification (the Notification).

In the Notification, Australia Post proposes to raise the price of certain ‘reserved services’ over which it has a statutory monopoly. We were asked by the ACCC to consider Australia Post’s methodological forecasting practices as well as the forecasts themselves. The current Notification follows a Draft Notification that was lodged in July 2009 and objected to by the ACCC in December 2009. One important reason for the rejection was because the volume and cost forecasts used by Australia Post were not transparently derived and did not appear reasonable with reference to historical trends.

Australia Post has adopted a more sophisticated approach to forecasting mail demand for this Notification. Its consultant, Diversified Specifics, has derived baseline econometric forecasts, based on best practice time series techniques for mail volume forecasting. Australia Post has then augmented these baseline forecasts using internal, business-specific knowledge. While these developments herald a significant improvement in methodology, we have some concerns about the way the new forecasts have been derived:

- Based on the materials provided to us, the econometric analysis has some shortcomings. We do not know the quantitative significance of these shortcomings on the baseline forecasts, but we believe the analysis would benefit from further examination.
- The way that the forecasts have been augmented by Australia Post is problematic:
 - There is little or no justification provided for the size of specific augmentations.
 - It is not clear whether the augmentations are adopted because the econometric models omit relevant relationships (perhaps because of data unavailability), or because the relationships embedded in the models are expected to deviate from historical trends.

On the costs side, there have been substantial reductions forecast in operating costs compared with the forecasts in the July 2009 Draft Notification. In nominal terms, costs are expected to remain steady from 2008/09, rather than increasing at their historic rate. In real terms, this implies cost declines and is more consistent with our expectation that costs should fall in line with volumes. The material provided on cost-volume relationships gives a plausible explanation of likely changes in costs, but the specific values referred to appear low relative to

international benchmarks, and are not supported with quantitative evidence. Our concerns expressed in our analysis of the Draft Notification regarding transparency of the forecasts remain. There is no obvious linkage between changes in specific cost drivers (e.g. GDP growth) with the cost forecasts, and therefore it is difficult to assess how different assumptions about those factors would influence costs.

1 Introduction

Frontier Economics (Frontier) has been engaged by the Australian Competition and Consumer Commission (ACCC) to provide an independent assessment of the demand and other inputs used by Australia Post in its April 2010 price notification.

This report follows a November 2009 report (November report) that we prepared for the ACCC in response to price changes proposed in Australia Post's July 2009 draft price notification.

As with our previous consultancy, the purpose of this consultancy is to critically assess the approach taken by Australia Post to forecasting future mail volumes, operating costs and other input data. In the ACCC's consultancy specification, Frontier's tasks are listed as follows:

- Review the approach taken by Australia Post to forecasting future mail volumes and operating costs.
- Consider whether Australia Post has appropriately accounted for the effect of reduced mail volumes on Australia Post's costs (i.e. consider the extent to which Australia Post's costs are volume variable).
- Provide adjusted forecasts with the associated justification and methodology if Frontier's views about Australia Post's forecast volumes and operating costs differ from Australia Post's forecasts.

It was agreed that Frontier should focus on critiquing Australia's Posts forecasting methods and the likely accuracy of its forecasts. Any adjusted forecasts, if necessary, would be developed under a subsequent consultancy agreement.

1.1 Background

To increase the prices of its reserved letter services in accordance with the *Trade Practices Act 1974* (the TPA), Australia Post must provide the ACCC with a locality notice specifying the proposed price increases, and receive a response from the ACCC stating that it has no objection to the proposed price increases, or price increases that are less than those proposed by Australia Post.

Australia Post provided a draft notification to the ACCC in July 2009, proposing price changes to take effect from January 2010. The ACCC's draft report on this notification objected to the proposed price increases.

In response to the ACCC's rejection of its proposed price increases, Australia Post supplied a further notification in April 2010, with price changes to take effect from 28 June 2010. This notice was supported by an accompanying

document *Supporting Information to Australia Post's Notification of Domestic Reserved Letter Service Price Changes, 1 April 2010*.

The price changes that are the subject of the April 2010 notification are the same as those originally proposed in July 2009 which outlined Australia Post's proposal to increase the prices of letter services over which it has a statutory monopoly (reserved services). In particular, Australia Post proposed to increase the basic postage rate by 5c to 60c.

Australia Post's reserved services extend to the collection, within Australia, of letters for delivery within Australia and the delivery of letters within Australia, with the exceptions of letters weighing more than 250g, and letters that are carried for a charge at least four times the basic postage rate.

As Australia Post is seeking a price increase for services over which it has a monopoly, it is imperative that any price increases are properly justified and supported by robust data and analysis.

1.1.1 Frontier's November 2009 report conclusions

As noted above, Frontier's November report commented on the cost and volume forecasts in Australia Post's draft notification. In the November report, we concluded that:

- Australia Post has an incentive to under-forecast volumes as lower expectations of future demand support the case for increasing letter prices.
- Australia Post's methods for forecasting volumes were not based on a rigorous framework designed to produce accurate forecasts; rather, they evolved from commercial decision-making, and the various processes of derivation and review were not clearly and transparently documented. They were also not based on any statistical modelling, although some account has been taken of econometric work on drivers of Australia Post's demand. Nor were the forecasts amenable to sensitivity analysis on the key expected drivers of demand. Given a lack of formal methodology for developing the forecasts, it was difficult to critically assess their veracity.
- The modelling work of Australia Post's consultants, Diversified Specifics, was not specifically designed for forecasting mail volumes, but was used to inform Australia Post about historical trends. Although the work itself may have had value, it was difficult to place this work into context because it did not explicitly link to Australia Post's forecasts.
- As for its demand forecasts, Australia Post's input cost forecasts (usually consisting of a quantity variable and possibly a price variable, such as FTEs and wages to derive labour costs) were not derived or checked using a statistical methodology. This made it difficult to assess the input cost

forecasts, and we consequently examined the forecasts primarily against historical trends.

- The input cost forecasts were broadly in line with historical trends. However, given the forecast declines in letter volumes, this was problematic. It implied little to no relationship between the forecast lower volumes and Australia Post's costs, which was not consistent with international experience.

1.2 Process of this review

This review considers the new information provided by Australia Post in its April 2010 Notification to support the proposed price increases. Our task has been to assess whether the new approaches taken to forecasting volumes and input costs by Australia Post are reasonable for a regulated firm using a building-block pricing model.

In undertaking this task, we have:

- Reviewed the material on volumes and input costs in the Notification and supporting material provided to us by Australia Post.
- Requested some further information from Australia Post.
- Conducted a review of the econometric analysis performed by Diversified Specifics to forecast baseline mail volumes. This included:
 - Reviewing Diversified Specifics March 2010 report that provides an overview of the development of the models.
 - Reviewing Diversified Specifics modelling outputs provided in a number of supporting documents, including the results of structural break testing, variables selection, and unit root and cointegration testing.
 - Performing quality assurance of the forecasting models by reproducing the modelling results based on the raw data provided to us.
- Reviewed and analysed the following data:
 - Volume forecasts generated by Australia Post, including the use of augmentations to the baseline econometric forecasts.
 - Cost and quantity of input forecasts generated by Australia Post.

1.3 This report

The remainder of this report is structured as follows:

- In section 2, we analyse the volume forecasts used by Australia Post in the Notification.

- In section 3, we analyse the input forecasts used by Australia Post in the Notification.

2 Volume forecasts

2.1 Background

As discussed in the introduction to this report, Frontier was engaged by the ACCC to review mail volume forecasts in Australia Post's July 2009 Draft Notification. A key finding was that Australia Post's forecasting methodology was not transparent and therefore not amenable to a critical review. We were sympathetic to its views that forecasting mail demand was difficult in an environment of falling volumes, when, historically, volumes had been rising. However, we concluded that a two-stage forecasting framework could be adopted which could increase forecasting integrity and give Australia Post an opportunity to use its specific market intelligence in the forecasts.

In the first of the two stages, an econometric model would be used to produce baseline volume forecasts. The second stage would entail adjusting the baseline forecasts to reflect Australia Post's market intelligence about anticipated behavioural changes that were not captured in the econometric model.¹

Australia Post has adopted our recommended approach in its April 2010 Notification. Its forecasting process consisted of:

- “development of several dynamic econometric models to provide baseline volume forecasts; and
- augmentation of these baseline forecasts to incorporate management opinion and further market intelligence.”²

The high-level approach adopted by Australia Post is now in line with the internationally-accepted leading practices in mail volume forecasting.

In the following analysis, we set out our investigation of Australia Post's implementation of the forecasting methodology. We provide comments on both the econometric analysis used to derive the baseline forecasts, and the augmentations to these forecasts applied by Australia Post. We also recommend some changes and extensions that could be adopted to improve the forecasts.

¹ Frontier Economics, “Review of Australia Post's volume and input cost forecasts,” November 2009.

² April 2010 Notification, p.9.

2.2 Baseline forecasts derived by Diversified Specifics

Australia Post's baseline forecasts were developed by Diversified Specifics using an error correction modelling framework. As noted in Frontier's 2009 report (p.32), this modelling framework is the foremost approach in forecasting mail volumes. It provides for a long term equilibrium relationship between mail volume and the main mail volume drivers, while also allowing for short term dynamics in the modelled relationship.

Although Diversified Specifics has now adopted a sophisticated approach to mail volume forecasting, the specific details of the modelling implementation are important. In the following sections, we review the overall modelling approach and the specific details of its econometric analyses.

2.2.1 Modelling approach

The approach used by Diversified Specifics to develop the econometric models used to produce the baseline volume forecasts for each of the four letter types consists of the following successive steps:

- testing for structural breaks and selection of the estimation period
- variable selection
- testing for non-stationarity of the variables and testing for cointegration
- estimating a vector error correction model (VECM).

In the first step, Diversified Specifics posited a preliminary long run static (LRS) model for each letter type and tested it for a structural break within the sample period.³ Where a structural break coincided with a known change in postal office practices, such as the closure of the unbarcoded pre-sort service, Diversified Specifics included a dummy variable to account for the break. Where a structural break occurred at a time point with no obvious explanation, Diversified Specifics truncated the sample at the break point and only used the later period in further analysis.

We understand (from the background materials provided to us) that the models resulting from this step were then taken as the starting point for the next step – variable selection.⁴ Using insights from its previous mail volume studies,

³ We discuss this step in more detail below.

⁴ However, this does not seem to be the case for “other large letter” volumes. The preliminary LRS model, which was used to test for structural breaks, included a dummy variable for the economic downturn and was estimated over the 2001Q2 to 2009Q3 period. When performing variable selection, Diversified Specifics started with a model that excluded the dummy variable for the economic downturn and was estimated over the period 2001Q3 to 2009Q3.

Diversified Specifics tested the four preliminary LRS models by including alternative and additional variables to derive the preferred specification for each model. Diversified Specifics chose the preferred LRS model for each letter type based on data availability, diagnostic tests and common sense checks.

Diversified Specifics' first two steps, in which the preferred LRS model for each letter type is determined, were undertaken before the selected variables were tested for stationarity and cointegration.⁵ This is not the commonly accepted approach to time series modelling, as it could lead to incorrect inferences about the relationship between the dependent and explanatory variables. Specifically, the critical values of the tests for structural breaks used by Diversified Specifics are incorrect when using non-stationary data,⁶ as are the critical values of t-statistics used to decide on the inclusion/exclusion of variables.⁷ Hence, the decisions made by Diversified Specifics in regard to the appropriate estimation period and the inclusion or exclusion of variables from the preferred model are based on invalid tests.

Our view is that the correct approach would have been to first establish that non-stationary time series are cointegrated (i.e. that there is a long run relationship between the variables of interest), and then rely on the t-statistics in the VECM to select a preferred model; or, alternatively, to use one of the non-VECM approaches discussed in Lim and Martin.⁸ We acknowledge that this could be laborious work if the number of potential explanatory variables is large. As an alternative, differencing all variables (to make them stationary) and then testing their explanatory power could potentially have provided insight into which variables are good candidates for the inclusion into the preferred model. Without performing a considerable amount of additional analysis, it is difficult to assess whether a different model would have been selected as the preferred model for each letter type if either of our suggested approaches were followed.

2.2.2 Structural Breaks⁹

Using the econometric package, EViews, Diversified Specifics performed the Quandt-Andrews (Q-A) test to test for structural breaks in the parameters of the

⁵ In its March 2010 report (p. 6), Diversified Specifics states that “[o]nce the preferred log run model has been selected all member variables are then checked for non-stationarity via a series of unit root checks and ultimately cointegration.”

⁶ See Hansen, B. (1992), “Tests for parameter instability in regressions with I(1) processes”, *Journal of Business and Economic Statistics*, 10, 321-335.

⁷ See, for example, Franses, P. (1998), *Time Series Models for Business and Economic Forecasting*, p.201.

⁸ Lim, G. and Martin, V. (1995), “Regression-based cointegration estimators with applications”. *Journal of Economic Studies*, 20(1), 3-22.

⁹ This section presents our review of the modelling results reported in the document titled “10 02 28 Structural Break Tests for AP (Sent).”

preliminary LRS models. This is a standard approach in applied econometrics to testing for unknown breaks.¹⁰ EViews enables the parameters included in a model to be tested for breaks individually or together. Diversified Specifics used the latter approach.

When variables are tested together, the joint null hypothesis of no structural break in any of the parameters is tested against the alternative hypothesis that at least one of the parameters has a break over the sample period. Hence, the inference from rejecting the null hypothesis is that there is a break in at least one of the parameters, but the test does not identify the specific parameter(s). Additional tests could be performed in EViews to investigate this. Such tests could have important policy implications as they could identify, for example, whether in addition to a shift in the level of the dependent variable, there has been a change in one of the slope parameters, such as the price elasticity.

After identifying a break date with the Q-A test, Diversified Specifics' approach was to account for any structural break which coincided with a known change in postal office practices, such as the closure of the unbarcoded pre-sort service, by including a dummy variable in the LRS model, thus explicitly assuming that the break occurred only in the intercept. It is unclear whether Diversified Specifics tested for breaks in any of the other parameters in the models, and/or why they decided against allowing for such breaks. Without such an explanation, the approach seems inconsistent with the Q-A test performed (where all variables were tested for a break together, rather than individually).

Box 1 summarises key structural-break modelling issues specific to each letter type.

Box 1: Summary of specific modelling issues

Other small letters

- Testing for additional structural breaks using a sequence of Chow tests is based on a criterion that is inconsistent with how the break date is determined using the Q-A test.
- Structural breaks are controlled for differently - one break is controlled for by including a binary variable to allow for a shift in the intercept, while the second break is controlled by truncating the sample. No explanation is provided to justify different modelling approaches.

Pre-sort small letters

- Structural break modelled in the preliminary LRS model (1999Q4) is different from the structural break identified with the Q-A test (2002Q3).

¹⁰ As mentioned earlier, the critical values for the standard Q-A test require that the variables in the equation are stationary. Diversified Specifics' subsequent testing for unit roots indicates that this is not a valid assumption for any of the letter types. While this is cause for concern in its own right, we put this issue to one side to focus on other concerns we have with the way Diversified Specifics tested for structural breaks.

Other large letters

- The preliminary LRS model used for structural break testing already includes two dummy variables for structural breaks in the intercept. This approach is inconsistent with the approach employed for other letter types where the preliminary LRS model had no dummy variables.
- Additional structural break testing is done by sequentially truncating the sample by one quarter until the sample period yields statistically significant estimates. This is not a standard way of testing for structural breaks.

Pre-sort large letters

- Replicating Diversified Specifics' structural break analysis using the Q-A test in EViews 6, we find the breakpoint at the same date as Diversified Specifics. However, unlike Diversified Specifics, we find the result to be statistically significant.¹¹

A more technically detailed discussion of the issues above was provided to the ACCC as part of our draft report.

Source: Frontier Economics

2.2.3 VECM

Once Diversified Specifics established the preferred LRS model for each letter type, it undertook a sequence of standard tests to develop a preferred VECM for each letter type. Specifically, Diversified Specifics first tested variables included in the LRS models for stationarity. Finding those variables to be difference stationary, Diversified Specifics proceeded to test whether there were cointegrating relations among the variables included in each model. Testing for cointegration was done by specifying VECMs with different deterministic components (i.e. intercept and trend) and, subsequently, different lag structures. For each letter type, the VECM with one cointegrating vector was selected as the preferred model.

Frontier reviewed the modelling results and has no issues with the analyses performed.

2.2.4 Assumptions - GDP and CPI forecasts

In deriving volume forecasts, Diversified Specifics used forecasts for non-farm gross domestic product (GDP) growth rate and consumer price index (CPI) provided by Australia Post. From the information provided in the Notification (p. 14), it is not clear how Australia Post derived those forecasts.¹² Rather than

¹¹ We obtain different values to Diversified Specifics for the maximum Wald F-statistic. The difference in the values of the maximum Wald test statistics for the Q-A test is most likely due to a coding error for this test reported by EViews; a patch is available on the company's website.

¹² Australia Post states that its major sources of information were the Reserve Bank of Australia, Access Economics, and the Commonwealth Treasury, while it also considered information from the International Monetary Fund, the Organisation for Economic Co-operation and Development, the National Australia Bank and The Economist.

just listing the sources of information, our view is that Australia Post should: indicate the exact information/assumptions it used from each institution; provide the link to those information/assumptions (if publicly available); and then explain how they were used to derive the GDP growth rate and CPI estimates.

We note that Australia Post's GDP growth rate projections for the first two years of the Notification period are lower than the Reserve Bank of Australia's (RBA's) projections (by 1 and 0.5 percentage points, respectively), while Australia Post's CPI projections are lower than RBA's projection in all three years (by 1.25 percentage points in the first year and by 0.25 percentage points in the last two years).¹³ It is difficult to judge whether Australia Post's projections are reasonable or justified without a clear understanding on how these rates were derived. However, to assess how sensitive the results are to the GDP rate projections, we performed a sensitivity analysis by forecasting pre-sort small letter volumes using the econometric model developed by Diversified Specifics together with the RBA's GDP projections. Such derived forecasted annual volumes are, on average, about 0.3 per cent higher than the volumes derived using Australia Post's GDP growth rate projections.

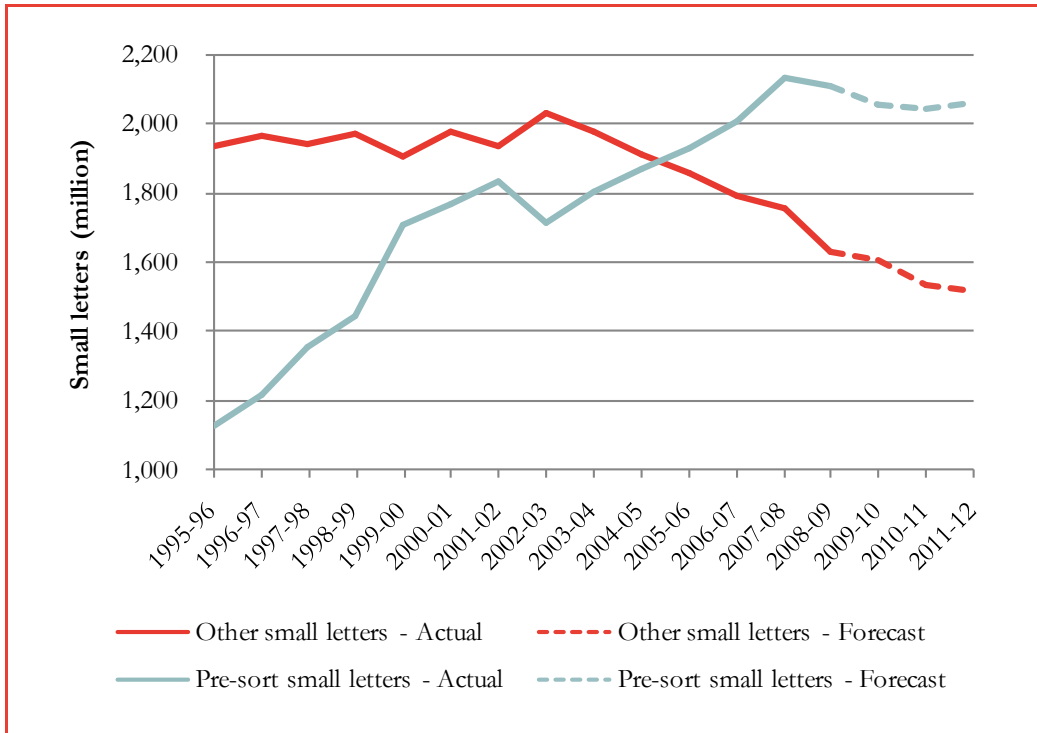
2.2.5 Baseline forecasts

Diversified Specifics provided us with the data it used in developing its econometric models as well as the modelling outputs produced using EViews. Using the raw data, we were able to replicate for each letter type Diversified Specifics' preferred VECM (reported in Appendix B of the March 2010 report) and the forecasted volumes reported in the supplementary materials provided to us.¹⁴ The forecasts are presented in Figure 1 and Figure 2.

¹³ See the Reserve Bank of Australia, Statement on Monetary Policy – February 2010, available at <http://www.rba.gov.au/publications/smp/2010/feb/html/tables.html#table-12>

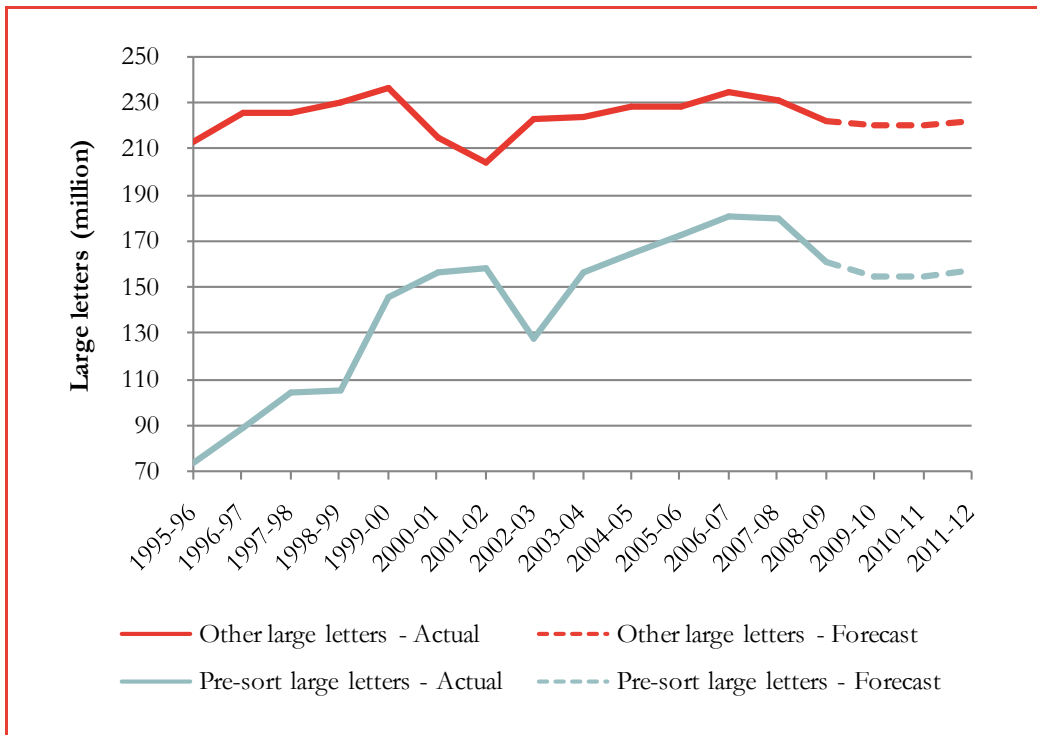
¹⁴ The supplementary documents are: “10 02 28 Other SL VECM Outputs USED for AP (Sent)”, “10 02 28 Other LL VECM Outputs USED for AP (Sent)”, “10 02 28 PreSort Barcoded SL VECM Outputs USED for AP (Sent)”, and “10 02 28 PreSort Barcoded LL VECM Outputs USED for AP (Sent).”

Figure 1: Small letters – Diversified Specifics' forecasts



Source: Diversified Specifics

Figure 2: Large letters – Diversified Specifics' forecasts



Source: Diversified Specifics

2.3 Forecasts derived by Australia Post

2.3.1 Baseline forecasts for 2009/10

Information provided in Appendix 3 of the Notification suggests that Australia Post did not rely on econometric modelling to derive forecasts for the four letter types for 2009/10, the first year in the price notification period. Other than noting that it considered the actual volumes for the first six months of 2009/10 when forecasting volumes for the entire financial year (p. 8), Australia Post did not provide any explanation as to how the volume forecasts for the year were derived.

Following the submission of the Notification, Australia Post provided new forecasts for 2009/10 which were based on nine months of actual volumes. The difference between these forecasts and the forecasts in the Notification is relatively small, ranging in magnitude (in absolute terms) from 0.01 per cent to 1.17 per cent across the four letter types. Although this comparison does not clarify Australia Post's forecasting methodology, it does provide some confidence that the forecasts for 2009/10 provided in the Notification are realistic.

2.3.2 Baseline forecasts for 2010/11 and 2011/12

Approach

Australia Post did not use the forecasted volumes from Diversified Specifics' econometric model as its baseline estimates. Rather, for each year it calculated the annual growth rate in Diversified Specifics' forecasted volumes, and then applied that growth rate to the forecast for the prior year's letter volume to calculate an "econometric baseline" forecast for the next year. Using growth rates from the econometric model, rather than the estimated volumes from the econometric model, is a reasonable approach as long as the baseline volumes in the initial forecast year, to which the growth rates are applied, are transparent and justified.

As noted in the previous section, it is not transparent how the baseline volumes in the initial forecast year (i.e. 2009/10) were derived; however, based on the additional information provided those forecasts appear realistic.

Assumptions

For other small letters, Diversified Specifics produced three volume forecasts by changing the assumption on the growth rate of the nominal price (which was treated as an exogenous variable). The assumptions were: (1) no increase in the nominal price; (2) increase in the nominal price in April 2010; and (3) increase in the nominal price in July 2010. Australia Post used this last series when calculating the average annual growth rate in volumes.

For the pre-sort small and pre-sort large letter types, Diversified Specifics produced two forecasts: (1) assuming no change in the consumer discretionary index; and (2) assuming that the consumer discretionary index will continue to decline at the same annual average rate of 8.83 per cent as it has since 2000/01. Australia Post used the former series (with the conservative assumption of no change in the index) when calculating the average annual change in letter volumes.

The assumptions used in forecasting volumes are reasonable.

2.3.3 Adjusted forecasts

To derive the final forecast volumes for each letter type, Australia Post adjusted the baseline forecast volumes to reflect management opinion and market intelligence that could not have been captured in the econometric model.

We note the following issues with Australia Post's approach:

- Although Australia Post did provide an overview of the factors it considered in deriving the adjustments (see p.10 and pp.39-40 in the Notification), it is not transparent how Australia Post quantified the effect of each factor. Australia Post should have provided a more detailed explanation of how the adjustments were calculated, what assumptions were used, and the basis for those assumptions.¹⁵ It should also have distinguished between factors that were not captured in the econometric model (for example, due to data issues) and the factors that were included in the model in some form (such as technological change), but where Australia Post believes that the prior relations between the mail volumes and those factors are likely to change over the notification period. A more detailed explanation is necessary for the following reasons:
 - The magnitude of the adjustments is non-trivial. In 2011/12 the total adjustment for each letter type ranges from 3.5 per cent (pre-sort small letters) to 10.2 per cent (other large letters) of the Australia Post econometric baseline forecast (see Table 1 and Table 2).
 - The sign and the magnitude of the adjustments result in a continuous decrease in letter volumes over the notification period across all four letter types even though the econometric model predicts an increase in some cases (see Figure 3 to Figure 6).

¹⁵ For example, Australia Post augmented the 2010/11 baseline estimate for pre-sort letters by 35 million letters to reflect expected increase in volumes resulting from the Federal elections. It would be informative to know whether this estimate is based on a contract that Australia Post is in the process of negotiating with the Federal Government, or whether it is based on the past experience.

Table 1: Letter volume demand – Small letters

Letter type		09/10	10/11	11/12
Other	Baseline forecast	-	1,460	1,442
	Adjustment	-	-39	-91
	Adjusted forecast	-	1,421	1,351
	Magnitude of adjustment (in absolute terms) as percentage of baseline forecast	-	2.7%	6.3%
Pre-sort	Baseline forecast	-	2,003	2,019
	Adjustment	-	-5	-71
	Adjusted forecast	-	1,998	1,948
	Magnitude of adjustment (in absolute terms) as percentage of baseline forecast	-	0.2%	3.5%

Notes: (1) We were informed that the adjustments presented in the Notification are incremental for that year, so the total adjustment for 2011/12 is equal to the adjustment in 2010/11 plus the incremental adjustment in 2011/12. The adjustments presented in the table above are total adjustments for the year.

(2) Volumes are in millions.

Source: Australia Post, Frontier Economics

Table 2: Letter volume demand – Large letters

Letter type		09/10	10/11	11/12
Other	Baseline forecast	-	184	186
	Adjustment	-	-9	-19
	Adjusted forecast	-	175	167
	Magnitude of adjustment (in absolute terms) as percentage of baseline forecast	-	4.9%	10.2%
Pre-sort	Baseline forecast	-	140	143
	Adjustment	-	-4	-9
	Adjusted forecast	-	136	134
	Magnitude of adjustment (in absolute terms) as percentage of baseline forecast	-	2.9%	6.3%

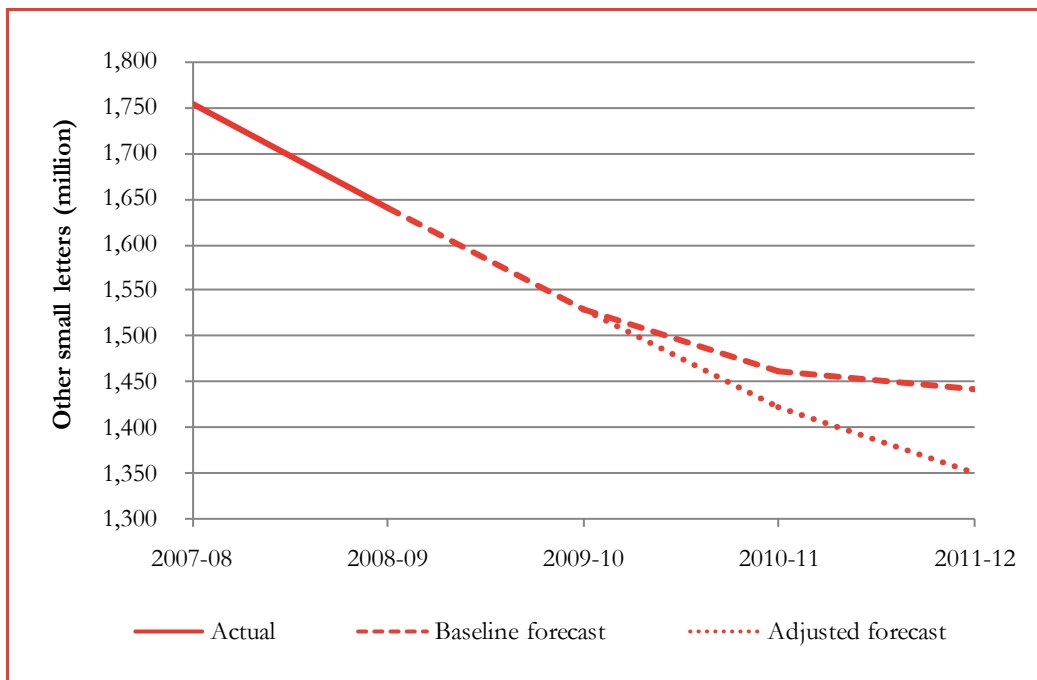
Notes: (1) We were informed that the adjustments presented in the Notification are incremental for that year, so the total adjustment for 2011/12 is equal to the adjustment in 2010/11 plus the incremental adjustment in 2011/12. The adjustments presented in the table above are total adjustments for the year.

(2) Volumes are in millions.

Source: Australia Post, Frontier Economics

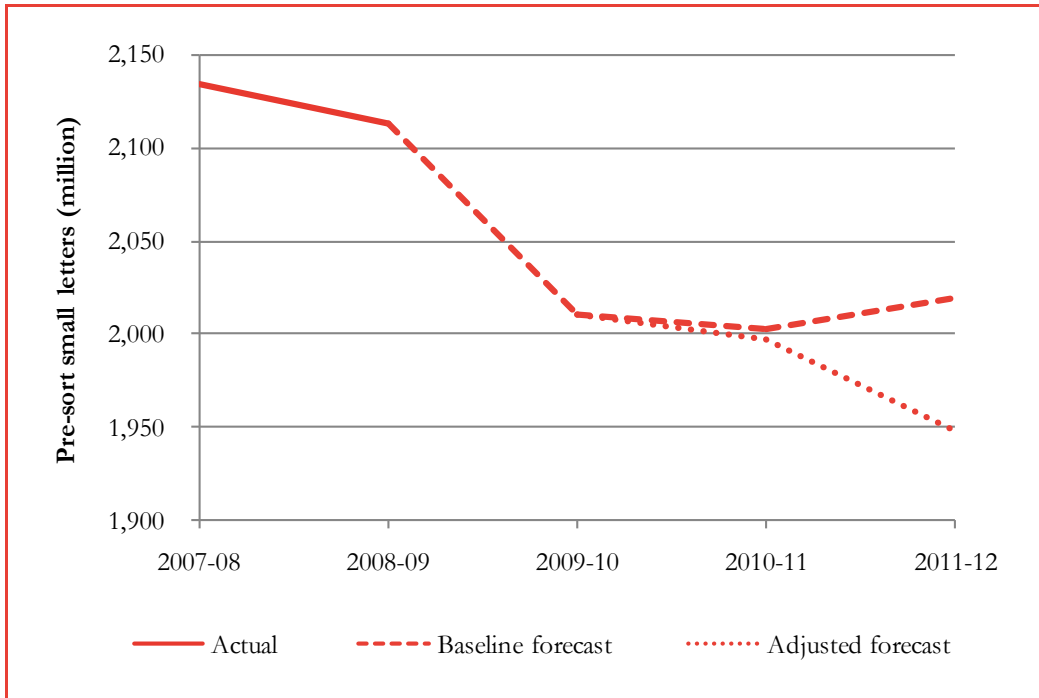
- The large letter historical volumes data provided to Diversified Specifics and used in their econometric modelling included all large letter volumes up to 500g, while the large letter volume estimates in the Notification include large letters up to 250g. If, historically, the two segments of large letter volumes have grown at different rates, then the growth rates applied to large letters up to 250g to derive “econometric baseline estimates” in the Notification are biased as they reflect both the growth rates in large letters of 250g or less, and the growth rates in large letters over 250g. We are uncertain as to the magnitude of any introduced bias.

Figure 3: Other small letters – Australia Post’s forecasts



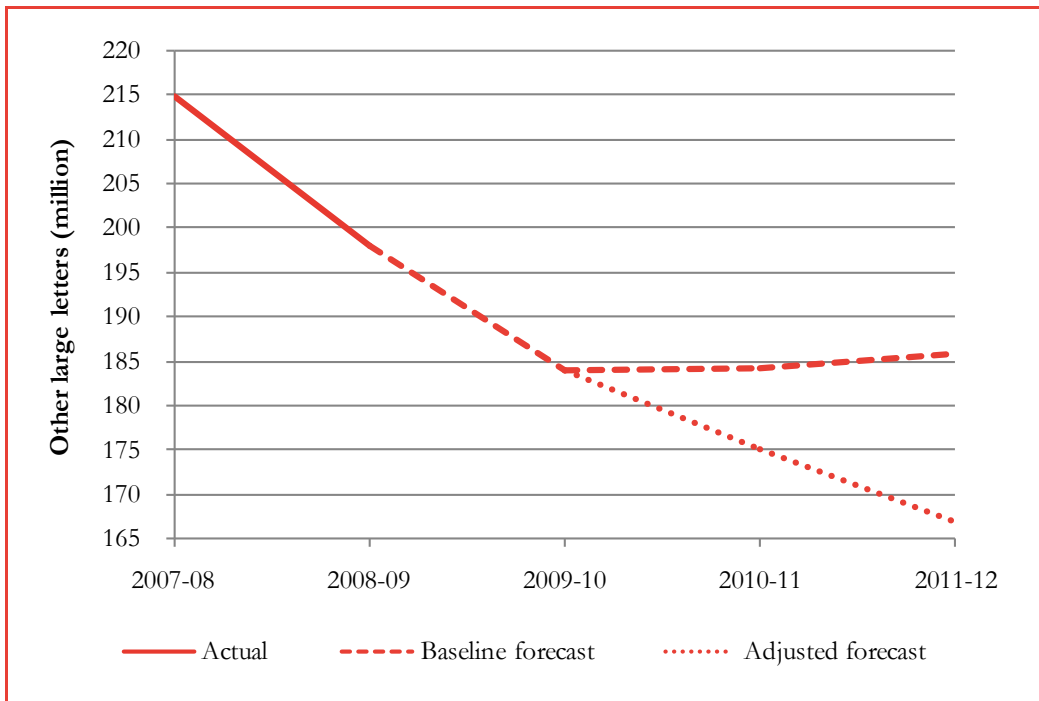
Note: Adjusted forecasts equal baseline forecasts plus the total adjustments for the year.
Source: Australia Post

Figure 4: Pre-sort small letters – Australia Post's forecasts



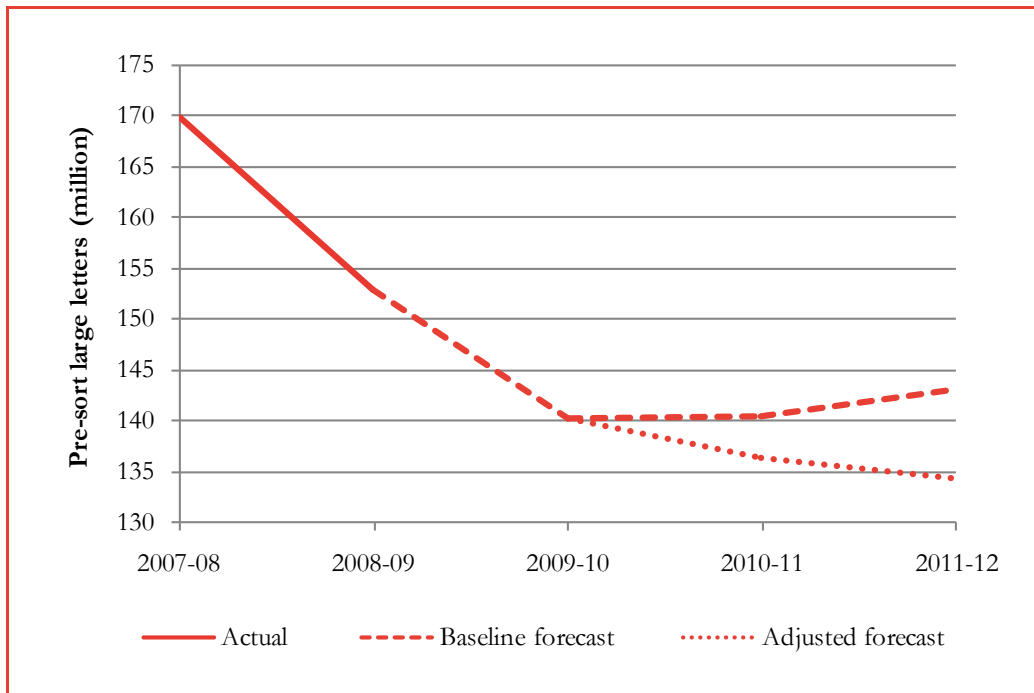
Note: Adjusted forecasts equal baseline forecasts plus the total adjustments for the year.
 Source: Australia Post

Figure 5: Other large letters – Australia Post's forecasts



Note: Adjusted forecasts equal baseline forecasts plus the total adjustments for the year.
 Source: Australia Post

Figure 6: Pre-sort large letters – Australia Post’s forecasts



Note: Adjusted forecasts equal baseline forecasts plus the total adjustments for the year.

Source: Australia Post

2.4 Conclusions

Australia Post adopted a two-step approach to volume forecasting, consistent with the approach we recommended in our analysis of the Draft Notification. The first step involved the development of dynamic models in an error correction modelling framework, which in our view is the best practice approach in forecasting mail demand. The second step was to adjust the baseline forecasts to reflect Australia Post’s specific knowledge of customer demand and factors that could not be captured in the econometric model. The revised approach adopted by Australia Post represents a significant improvement in its forecasting methodology compared to the approach adopted in its 2009 Draft Notification.

Frontier reviewed the extensive modelling work undertaken by Diversified Specifics to develop baseline forecasts for Australia Post, and the augmentation of the baseline forecasts undertaken by Australia Post. We consider the following to be the key concerns with the econometric and the augmentation analyses:

- Econometric analysis:
 - The decisions made by Diversified Specifics in regard to the appropriate estimation period and the inclusion or exclusion of variables from the preferred model are based on invalid tests. Additional analyses should be performed to ensure that the “preferred models” were correctly specified. However, we note that the amount of work needed to investigate this

issue is likely to be considerable as testing for structural breaks and variable selection with non-stationary variables is not a straightforward exercise.

- In modelling small pre-sort letters, Diversified Specifics controlled for a structural break at the date different than the one identified by the Q-A test. Controlling for a structural break identified by the Q-A test would have resulted in different parameter estimates and, therefore, different forecasts.
- Augmentation analysis:
 - Australia Post has not transparently quantified the effect of each factor considered in deriving the adjustments for the baseline forecasts and whether their inclusion is justified.
 - It is not clear from the Notification to what extent the adjustments were necessary because the volume-drivers were not captured in the model, and to what extent the adjustments were needed because Australia Post expects that the prior relations between the mail volumes and those volume-drivers are likely to change over the notification period.

3 Cost forecasts

3.1 Introduction

As with our approach to volume forecasts, we assess the cost forecasts on the basis that Australia Post's methodology for forecasting costs should meet certain standards. These forecasts should ideally:

- be clear in their derivation, with key assumptions documented (along with the basis for making them)
- bear some relationship to historical trends, and, where they do not, there should be a detailed explanation about the reasons for, and quantitative significance of, any expected deviations
- allow for some flexibility, so that sensitivity analysis can be conducted (e.g. using different macroeconomic forecasts).

In the following sections, we outline how the forecasts are presented and used in the Notification. Then we turn to an examination of the forecasts themselves.

Similar to our approach in our November 2009 report, we:

- identify the major cost categories and identify how these are likely to change over the forecast period
- compare these forecasts to relevant benchmarks or historical data
- identify the relationships that are implied between costs and volumes
- assess the material presented in support of the claimed cost volume relationships.

3.2 Information supplied by Australia Post

The ACCC seeks a detailed description and analysis of the forecasts produced by Australia Post, including consideration of whether it has sufficiently accounted for cost-volume relationships and analysis of how the forecasts compare to relevant benchmarks.

Australia Post says its new information focuses primarily on demonstrating the efficiency of Australia Post's cost base, rather than justifying its cost forecasts (see p. 13). This provides context for the lack of historical cost data in the Notification. However, Australia Post was able to provide us with revised data series including the historical data that was supplied to us in preparing our November report.

Compared to the 2009 draft notification, there is considerably more material describing and quantifying the relationship between costs and volumes, and its budgeting/forecasting method.

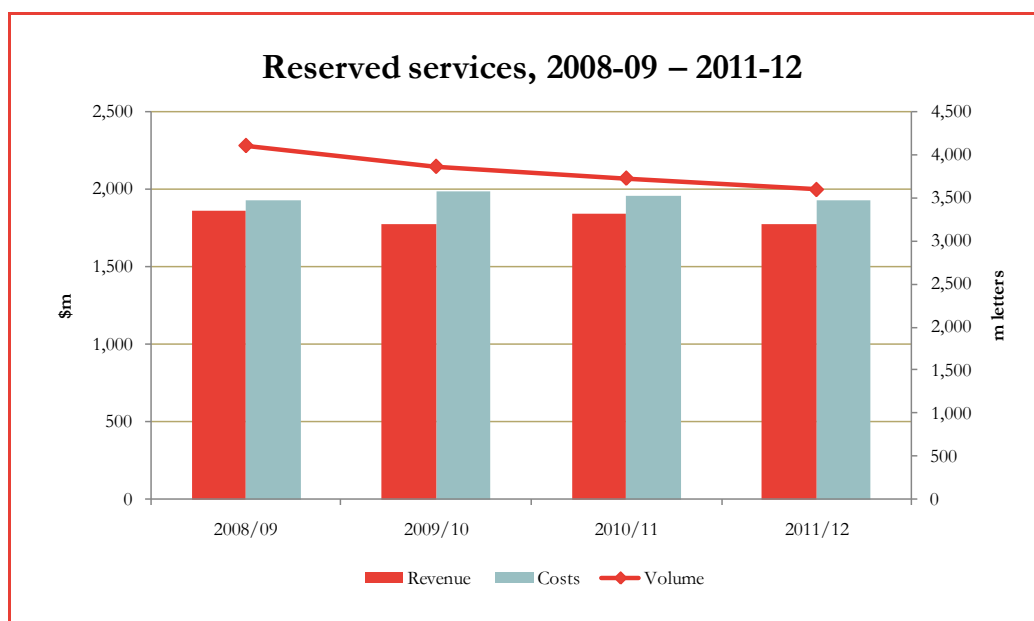
3.3 Cost structure and forecasts

Before turning to the forecasts of costs, it is useful to outline the cost trends and the structure of Australia Post's cost base – both by function (retail, transport, sorting and delivery) and by type (labour, capital and other). This is for three reasons:

- it allows for focus on the more important categories of costs
- the relevant cost drivers for each function are likely to be quite different. In particular, some functions are likely to be volume-sensitive (particularly mail sorting) while other functions may not be (e.g. delivery costs tend to be more sensitive to the number of delivery points in Australia Post's network)
- the trends give an indication of how costs are forecast to vary with volumes.

Australia Post outlines its high level forecasts for Reserved services on p. 21 of the Notification. This is replicated in Figure 7, together with a further year of data in a spreadsheet provided to us by Australia Post.

Figure 7: Domestic reserved letters – volume, revenue and cost forecasts



Source: Australia Post

From Figure 7, we can see that Australia Post is now forecasting that, in nominal terms, costs will increase slightly in the year 2009/10, and then decline in the period to 2012.

Australia Post does not provide a breakdown of costs by expense type until the year 2009/10. From this point until 2011/12, small declines in cost are forecast. Further detail as to the source of these cost declines are in ~~XXX~~

Figure 8. ~~XXX~~

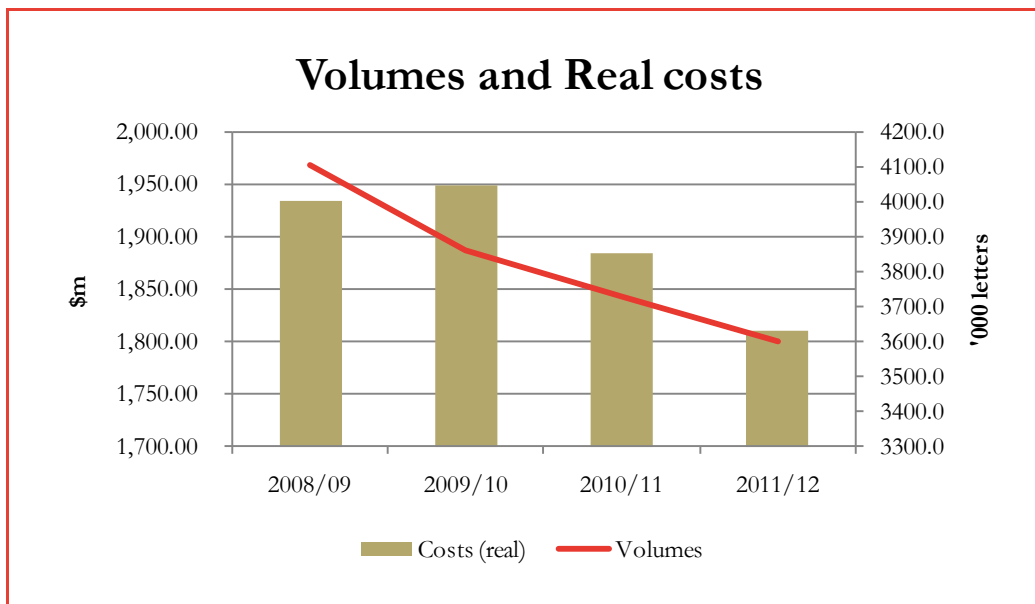
Figure 8: Forecast cost base for reserved services, by type of cost

~~XXX~~

Source: Australia Post

Overall, a key point of interest is whether the aggregate volume trend is closely reflected in cost trends. There have clearly been cost reduction strategies implemented since the July 2009 Draft Notification, which forecast nominal cost *increases* along with volume falls. Figure 7 indicates a total fall in volumes of over 12 per cent is accompanied by a 0.1 per cent reduction in nominal costs. However, in real terms, the cost reduction is 6.6 per cent – around 50 per cent of the expected volume decline. This is illustrated in Figure 9.

Figure 9: Comparison of changes in volumes and costs (deflated by CPI) for reserved services



Source: Australia Post

In the last three years (2009/10 – 2011/12), costs and volumes both fall by around 7 per cent.

3.4 Input cost forecasts

3.4.1 Overall approach

We suggested in the introduction to this section that the *process* of cost forecasting should be subject to some scrutiny. The forecasting process adopted should give some assurance that Australia Post's expenditures are prudent and efficient, and will remain so over time.

We argued in our November 2009 report that for regulated businesses forecasting approaches should be transparent and able to be effectively reviewed by a third party. Such processes are relatively standard in regulatory processes.

Australia Post addresses its Corporate Plan and general budgeting process in section 5.1 of the Notification. Australia Post suggests that the budget process (p. 14):

provides a structured and transparent approach to cost management based on clear accountabilities for targeted savings across the management hierarchy, and direct traceability for the fundamental cost drivers in the budget base.

Notwithstanding these claims, the information on costs provided by Australia Post does not give much specific detail about how the cost forecasts have been constructed, and/or what assumptions underlie them. For example, from Tables 5 and 6 and surrounding text we know that: Australia Post has assumed certain values for CPI, GDP and wage growth; that these assumptions are related in some way to forecasts produced by, *inter alia*, the Reserve Bank of Australia, Access Economics and the Commonwealth Treasury; and that "the outcome of future wage negotiations will trend in a similar way to changes in the ABS labour data" (p. 14). However, we do not know exactly how the CPI, GDP and wage growth figures have been calculated, whether alternative parameter values would affect any of the cost estimates, or how Australia Post believes that future wage growth will be consistent with the ABS labour data.

This limits our ability to scrutinise the forecasts. The best we can do is to review historic trends for cost categories and to identify the quantitative significance of deviations from trends, and the acceptability of any provided explanation for such deviations (including whether the forecast cost change is consistent with forecast volume changes).

We further note that, notwithstanding issues with the transparency of the methodology, Australia Post's forecasts could have been supported with reference to benchmarking on the efficiency of its costs over time, such as benchmarking against international postal service operators or other regulated industry sectors. We understand that such analysis was part of its Draft Notification in 2009, but the ACCC did not consider this analysis demonstrated that Australia Post has been, and is presently, one of the world's most productive postal operators. No new material was submitted as part of this Notification.

We now turn to the particular categories of costs and how these are forecast to change.

3.4.2 Operations and maintenance costs

Labour

A large proportion of reserved service costs – over 60% – are labour related.

Forecasts for labour quantities and costs were provided by Australia Post for reserved services¹⁶. These are shown in the figure below, together with historical trend data that was initially derived by Australia Post's consultant, Economic Insights, using data provided to it for earlier TFP studies.

Figure 10: Reserved service labour costs and FTEs, actual and forecast

✂✂✂

The chart reveals that:

- ✂✂✂
- Labour prices are forecast to increase in nominal terms.
- ✂✂✂.

Labour prices, defined as labour costs divided by FTEs, are highlighted in Figure 11. Australia Post notes at p.14 of the Notification that it has an agreement with relevant staff associations to provide wage increases up until December 2010. Beyond this point it assumes that the outcomes of wage negotiations will trend in a similar way to changes in the ABS labour data. To confirm this, we mapped a simple linear trend onto historic wage trends. This indicates that Australia Post's forecast changes to labour prices are consistent with historic trends – ✂✂✂.

Figure 11: Australia Post's labour prices

✂✂✂

In Figure 12, we further examine the source and scale of the FTE reductions. ✂✂✂. This is important in the context of the cost and volume relationships that are discussed in Section 3.5.

Figure 12: Forecast FTEs

✂✂✂

¹⁶ Spreadsheet 'Reserved Service History and FTEs 2010.xls'.

Contractors

Australia Post uses a range of contractors to deliver mail.

In our November report, we noted that historic data on contract costs suggested that these have been rising faster than labour costs generally, although the rate of increase in costs is forecast to fall slightly. We had a concern that the reasons given by Australia Post at that time (effectively, that contract costs were increasing due to higher input costs (wages, fuel, etc) and a tightening labour market) did not provide a justification for future cost rises. Given the general downturn in postal volumes, this seemed a key area where cost restraint must be exercised.

In Figure 13, contractor volumes and costs are reproduced. Costs are forecast to increase $\times\times\times$ between 2008/09 to 2011/12, which is a $\times\times\times$ improvement compared to the forecasts in the July 2009 Draft Notification, which forecast cost increases $\times\times\times$. In real terms, the Notification forecasts essentially $\times\times\times$. These cost trends must be seen in the context of falling volumes, but also continued increases in delivery points over time.

Figure 13: Contractor costs and volumes – reserved services

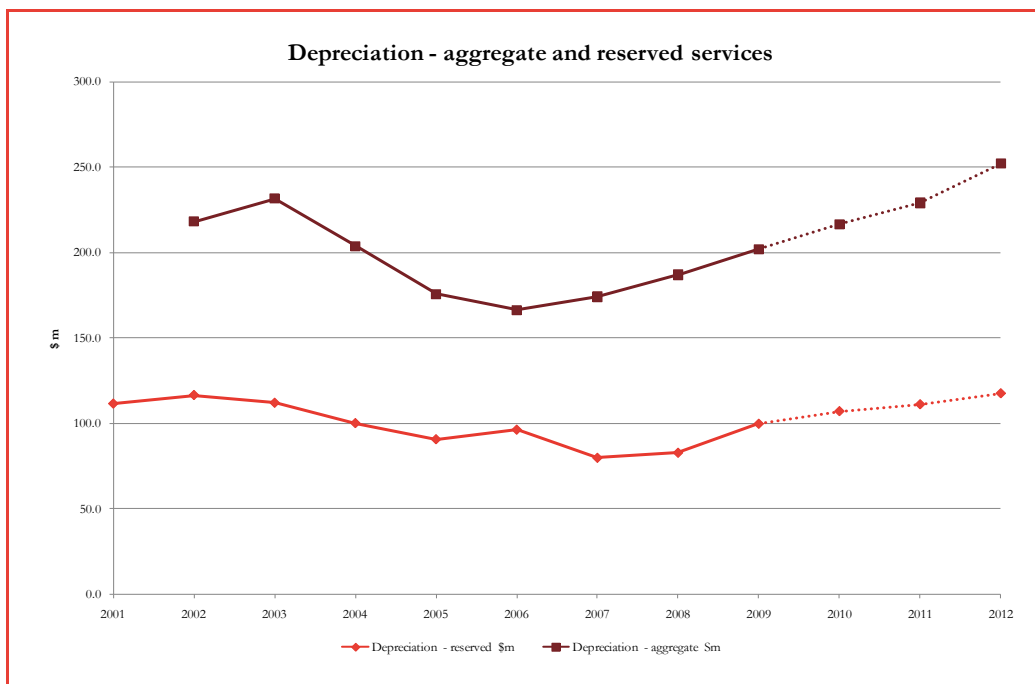
$\times\times\times$

3.4.3 Depreciation

Australia Post notes that Depreciation expense within the Notification is unchanged from the Draft Notification. These allocations are not updated as frequently as other cost items.

For completeness, we show the historic and forecast depreciation data both at an aggregate level and for reserved services in Figure 14. Earlier periods in the series show a decline in depreciation in both data sets. Since that time, the trend is clearly upwards, commencing its upswing from the 2006/07 financial year. The forecast levels do not look out of line with these more recent trends.

Figure 14: Depreciation – actual and forecast across reserved and aggregate services



Source: Australia Post

3.4.4 Other costs

The category of ‘Other expenses’ is not specifically defined in the Notification. A note to the table identifies that Other expenses. From the other items in that title, we can deduce that Other expenses excludes labour costs, contrail mail and licensee services costs, and accommodation costs. However, we are uncertain as to items that are actually covered.

These costs also do not appear to be consistent with the ‘other costs’ item identified in the Economic Insights work which we relied on in analysing the 2009 Draft Notification. Accommodation is an item included in that list of costs, but that is separately identified by Australia Post.

There are no specific claims made about the forecasting of these Other costs by Australia Post. Given that these are the identified over the period to 2011/12, we would expect to see more detail on what is driving these costs.

3.5 Relationship between costs and volumes

A major focus of our previous report was the postulated relationship between costs and volumes. In our conclusions, we noted that:

In broad terms, the cost forecasts are in line with historical trends. However, given the forecast declines in letter volumes, this is problematic. It implies little

to no relationship between the forecast lower volumes and Australia Post's costs.

Such an outcome would only be plausible if costs were completely inelastic to volume, and our reading of Australia Post's statements is that while much of the network cost is fixed due to the need to maintain regulated delivery standards, some cost savings are possible, particularly in the medium term. Overseas studies of delivery and sorting functions also indicate that while there are economies of density (that is, costs fall proportionally less than volumes), there should be some reduction in costs from lower volumes.

3.5.1 Cost volume relationships in the Notification

As we have identified in section 3.3, Australia Post is now forecasting a significant cost response to the lower expected volumes, with costs declining in real terms by around half the expected volume decline.

In the Notification, Australia Post also provides a range of material on relationships between costs and volumes, including an Appendix 6 which contains parameters (said to be used for budgetary purposes) for potential cost variability by function. This material is said to go to short run relationships between costs and volumes, with a recognition (p. 22) that cost volume elasticities can be expected to increase as a wider range of operational responses to declining volumes come into play.

Cost volume elasticities in Appendix 6 for particular functions are given as:

- Processing – 25% (i.e. a 1% increase in volume will increase processing costs by 0.25%).
- Delivery – 30%.

Breakdowns of cost variability by particular processing and delivery sub-activities are also provided. However, no specific justifications of particular parameter values are provided. Rather, a general analysis of the kinds of relationship that might be expected between costs and volumes for the functions (sales, processing, transport and delivery) is provided in section 5.5. of the Notification:

- Sales & Acceptance and Transport functions are considered minimally variable with volumes, as Sales & Acceptance costs are driven by standards relating to a minimum number of retail outlets, and Transport is driven by delivery standards on distance and frequency.
- Processing costs are variable in relation to those letters that are manually sorted or otherwise not processed by barcodes.
- Delivery costs are variable in relation to the 'indoor' component relating to round sorting and sequencing, but less so in relation to the 'outdoor' component (delivery to street addresses).

The material provided by Australia Post indicates that the variabilities or elasticities that are identified are consistent with the view that we expressed in our November report that it is implausible that costs would not fall in response to volume falls. The question then is whether the particular parameters adopted by Australia Post constitute a sufficient response to the forecast volume declines.

3.5.2 Appropriateness of particular cost volume parameters used

Australia Post's analyses in section 5.5 and in Appendix 6 do not establish the appropriateness of the particular parameter values. These parameter values would ideally be established using statistical analysis or by benchmarking with international postal operators (to the extent that international operators have a similar cost structure).

Australia Post refers (p. 23) to work that is being done for it by consultants on cost-volume elasticities. Until this work is complete, it is difficult to comment on the validity of the cost-volume elasticities claimed for various functions in Appendix 6.

On the parameters themselves, it is difficult to be definitive about how the parameters used affect the Notification. Australia Post has not provided a detailed breakdown of costs by function for this notification. However, Australia Post did provide a breakdown by function for the 2009 Draft Notification, which indicated that processing costs were 33 per cent of costs and delivery constituted about 33.

Assuming no cost variability for other functions, if volumes fall by 1 per cent, the cost volume elasticities for process and delivery costs indicate that total costs should fall by around 0.14 per cent. This appears to be less than the volume response actually forecast by Australia Post, which is somewhere between 0.5 and 1 depending on the base year chosen. That is, for each 1 per cent of forecast volume decline, costs are forecast to decline between 0.5 per cent and 1 per cent.

Compared to international studies, the elasticity of around 0.14 put forward by Australia Post appears low. As we suggested in our November report, international studies (which tend to focus on individual functions rather than total costs) appear to support elasticities below 1, but substantially greater than 0. A number of studies referred to put these elasticities between 0.60-0.70.¹⁷

Australia Post suggests in the Notification that international studies are specific to the data used, and have generally been estimated over periods of rising rather than declining letter volume. It may be difficult to translate these studies into

¹⁷ See e.g. Bozzo (2009), NERA (2004) and Moriarty et al (2006).

Australia conditions, but this view is not universally shared. Cohen et al (2004)¹⁸ suggests that for Postal systems with more than 200 pieces per capita, cost variability and cost behaviours are remarkably similar across postal systems. It is correct that most cost studies have taken place in an environment of volume increases; however, Australia Post has not provided evidence as to how this would influence the determination of appropriate cost-volume elasticities, or whether this has influenced its choice of cost-volume elasticities in Appendix 6.

A final issue with overseas studies is that they commonly estimate long-run cost elasticities, rather than short-run elasticities. They therefore represent the situation achieved once there has been time to respond to changes in volume by varying labour and capital that may be fixed in the short term. This seems to be a legitimate reason for the short-run elasticities used to be less than in international studies. Australia Post further claims, however, that “in current network circumstances where the volume declines have been greater for the products with higher proportions of variable processing costs...there is a challenge to sustain the current rates of cost variability as volumes decline.” (p. 22) No evidence is provided on why it is expected that further volume reductions are expected in categories which have a higher proportion of fixed costs (such as pre-sort categories). In fact, from Appendix 3, it appears that volumes for non-pre-sort categories are forecast to fall *more* than for pre-sort. That would seem contrary to Australia Post’s claim.

On the whole, it is positive that Australia Post has explicitly identified and used cost-volume elasticities in its cost forecasting. This contrasts with its July 2009 Draft Notification in which it made no reference to the existence of such elasticities, and merely assumed increasing costs in line with historic cost trends. The suggested elasticities and the accompanying text do provide a plausible explanation of existing short-run cost-volume relationships. However, there is no reviewable information supplied to support these relationships, meaning that they must be taken as indicative at best. Further – and like other elements of the forecasts – these are not related to particular forecasts in a transparent way.

3.6 Conclusions on cost forecasts

- Australia Post’s process of cost forecasting retains certain deficiencies that we identified in our report on the Draft Notification in 2009. In particular, forecasts are internally developed and while certain factors are pointed to in justifying particular forecasts, the linkages between the factors and the forecasts themselves are not transparent.

¹⁸ Although Cohen et al (2004) suggests that for Postal systems with more than 200 pieces per capita, cost variability and cost behaviours are remarkably similar across postal systems.

- That said, the forecasts indicate that Australia Post has identified a number of areas where cost savings can be made in response to the drop in volumes.
✂✂✂
- Australia Post's actions appear a suitable response to an environment of declining volumes, particularly when costs are considered in real terms. Aggregate costs are forecast to fall by around 6 per cent against volume falls of 12 per cent between 2008/09 – 2011/12. This response is also improved by considering only the three years between 2009/10 – 2011/12.
- It is positive that Australia Post has explicitly identified and used cost-volume elasticities in its cost forecasting. The elasticities suggested and the accompanying text do provide a plausible explanation of existing short-run cost-volume relationships. However:
 - the elasticities used appear low in comparison to those derived from international studies (and low in relation to Australia Post's actual forecasts).
 - there is no reviewable information supplied to support these relationships, meaning that they must be taken as indicative at best. Further – and like other elements of the forecasts – these are not related to particular forecasts in a transparent way.

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