FACT SHEET

Guide to the private ferry cost index model

The Independent Pricing and Regulatory Tribunal makes annual recommendations on maximum fares for private ferry services. We also determine fares for the Newcastle (Stockton) Ferry. In making decisions on appropriate fare changes for these services we consider the change in costs faced by the industry over the past year. We do this using 2 industry cost indices: the Slow Ferry Cost Index (SFCI) and Fast Ferry Cost Index (FFCI).

The SFCI and the FFCI models are now available from our website as an Excel file (www.ipart.nsw.gov.au). This paper is a guide to the Excel file. It provides some background on how cost indices work and then steps users through the Excel file. We recommend that this paper is read in conjunction with the Excel file.

This paper does not explain our decisions on inputs to the cost indices – this information is included in our annual review reports, which are also available on our website.

1 Background on how cost indices work

A cost index measures, in percentage terms, how much the overall cost of providing a particular type of transport services has changed in the 12 months since our last review. There are 2 parts to the index:

- a list of costs faced by the industry and their relative importance (weightings)
- an estimate of how each of these costs changes over time (inflators).

1.1 Weightings

The index costs and weightings are designed to represent the cost structure of a typical operator. The cost index consists of a 'basket' of cost items that a typical operator faces in providing transport services – such as fuel, labour and insurance costs. These items are weighted according to the proportion of the overall cost of providing services that they represent (eg, if paying wages is half of total costs then it has a weighting of 50%). Typically only significant costs are listed separately; the index usually has an 'other' cost item to capture smaller costs.

Initially the weightings are established by surveying the industry and working out a representative set of costs. IPART also seeks to periodically review the weightings (every 5 years or so) to make sure that the index continues to reflect the cost structure of the industry. Reviewing the weightings every 5 years allows the index to account for changes in the structure of the industry's costs over time.

In between these reviews, the weights are adjusted each year for changes in the relative costs of each input – costs that increased by more than the average this year will have a higher weighting next year and costs that increased by less than the average, or fell, this year will have a lower weighting next year. Adjusting the weightings in this way ensures that the index continues to reflect the costs faced by operators from year to year.

1.2 Inflators

We estimate the change in each cost item using a cost 'inflator', which is expressed as a percentage change. Each cost item has its own 'inflator', which aims to track the movement in this particular cost item over time. Wherever possible, we select inflators that are:

- based on independent and verifiable data that is publicly available
- a reasonable estimate of cost changes for operators.

For example, in the ferry cost indices, the relevant inflator for insurance costs is the change in the insurance services component of the CPI, which is published quarterly by the Australian Bureau of Statistics.

1.3 Calculating the change in costs

At the start of each review, we establish the relative weighting for each cost item in the cost index, and the value of its inflator. We then multiply the weighting by the inflator value for each cost item individually, to calculate the change in overall costs that cost item represents (ie, the contribution of any increase or decrease in the cost item since the last review to the overall change in the cost of providing the service). The sum of all these provides the increase in overall costs faced by the industry. This is the total change in the cost index.

2 What the SFCI and FFCI model does

The purpose of the SFCI and FFCI model is to:

1. Calculate the increase in costs of providing low speed ferry services via the Slow Ferry Cost Index (SFCI) and high speed ferry services via the Fast Ferry Cost Index (FFCI).
2. Calculate new weightings that will apply next year as the base weightings for the SFCI and FFCI.

The Excel model sets out all the inputs and calculations that are necessary to fulfil this purpose.

Base weightings in the model are determined according to the previous years SFCI and FFCI. Cost item growth rates are measured using pre-determined inflators and updated every year.

3 How the SFCI and FFCI model works

The calculations in the model are based on a number of steps:

- Step 1 – Input base weightings from previous year's SFCI and FFCI.
- Step 2 – Input inflator values.
- Step 3 – Calculate the change in the inflator values over the past year.
- Step 4 – Calculate the change in costs faced by the industry over the past year.
- Step 5 – Calculate the change in fares based on the outcomes of the SFCI and FFCI.
- Step 6 – Calculate the new weightings to be used as base weightings next year.

Each of these steps is explained in more detail below.

These steps are also set out on the 'Cover' worksheet in the model and are further explained via comments in the model.

3.1 Step 1 – Input base weightings

The starting point for each index is a list of costs and relative weightings. The costs and weightings are obtained from last year's SFCI and FFCI model (see Step 6 for information on how they are calculated) and are published in the previous year's final report. We enter the weighting for each cost item as a percentage of total costs. The sum of weightings for the SFCI and FFCI each add to 100.

The weightings are input into worksheet 1, in cells C12-C19 for the SFCI and cells D12-D19 for the FFCI.

3.2 Step 2 – Input inflator values

The next step is to fill in the values of the various cost inflators. The SFCI and FFCI both use the inflators listed in cells E12-E19 of worksheet 1.

The values of each of these inflators are found in cells F12-F19 of worksheet 1. These values are calculated from data in the individual input worksheets 2-4.

Table 3.1 Inflators used in the ferry cost indices

Inflator	Worksheet	What the inflator value is based on
WPI	Worksheet 2: ABS data	Wage price index using quarterly index numbers released by the ABS. The relevant WPI is the total hourly rates of pay excluding bonuses; NSW; all industries and occupations. ABS catalogue 6345.0
CPI Insurance	Worksheet 2: ABS data	Insurance services component of the CPI using quarterly index numbers released by the ABS. The relevant CPI measure is the insurance services sub group for Sydney. ABS catalogue 6401.0.
CPI	Worksheet 2: ABS data	Consumer Price Index using quarterly index numbers released by the ABS. The relevant CPI measure is the all groups index for Sydney. ABS catalogue 6401.0.
Price of diesel fuel	Worksheet 3: Fuel data	Sydney diesel fuel prices as tracked by FUELtrac an independent provider of information on fuel costs.
Interest	Worksheet 4: Interest	Business lending base rates provided by NAB.

3.3 Step 3 – Calculate the change in each inflator value

Worksheets 2-4 in the model calculate the values of the inflators used in the cost indices. This section explains how each inflator is calculated.

The final inflator values are summarised in Table 1.0 on worksheet 1 and are used in the calculation of the change in industry costs set out in step 4.

3.3.1 ABS Data

Several inflators are based on ABS data. For each of these inflators, we input quarterly index numbers released by the Australian Bureau of Statistics. We then calculate the change in these values over the past year. This calculation is done in worksheet 2 of the model. Table 3.2 summarises which cost items are inflated by ABS data.

Table 3.2 Cost items inflated by ABS data in the ferry cost indices

Cost item	Inflator
Labour	Productivity adjusted WPI
Insurance	CPI Insurance
Repairs and maintenance	CPI
Depreciation and amortisation	CPI
Berthing and mooring	CPI
Other costs	CPI

The change in the inflator value is based on the following formula, which compares the average of the 4 quarters of the review period to the average of the 4 quarters in the base period:

$$\Delta PI_t = \left(\frac{PI_{Dec(t)} + PI_{Mar(t)} + PI_{Jun(t)} + PI_{Sep(t)}}{PI_{Dec(t-1)} + PI_{Mar(t-1)} + PI_{Jun(t-1)} + PI_{Sep(t-1)}} - 1 \right) \times 100\%$$

Where:

- ΔPI is the change in the price index between review periods (this is the value used in the inflator)
- $PI_{x(y)}$ is the price index value at the time of the x quarter of y year
- t is the review year and t-1 is the base year.

For the cost items inflated by CPI Insurance and CPI, the value of ΔPI is the final inflator value. This is given in cells F44 and I44 in worksheet 2 of the model.

WPI based inflators are calculated differently because WPI does not account for improvements in the productivity of labour. We adjust the WPI inflator to account for productivity gains realised over the review period using a productivity adjustment which is informed by information relating to improvements in labour productivity over the past year.

To adjust for productivity gains, the labour cost inflator is reduced by the chosen level of the productivity adjustment as follows:

$$\Delta PAWPI_t = \frac{(1 + \Delta WPI_t)}{(1 + PA)} - 1$$

Where:

- ΔPAWPI is the productivity adjusted wage price index
- PA is the value of the productivity adjustment.

This calculation is given in cell C44 in worksheet 2 of the model.

3.3.2 Fuel Data

Fuel costs in the index are inflated by actual diesel prices provided by FUELtrac.[1] The fuel prices used are diesel pump prices for the Sydney metropolitan area. These prices are then adjusted to remove the cost of fuel excise and GST, which are not met by private ferry operators.[2] The average diesel fuel price for the review period is then compared to the average price in the base year to obtain an estimate of the change in fuel costs face by operators over the review period. This calculation is shown by the following equation:

$$\Delta Fuel_t = \left(\frac{D_t - G_t - E_t}{D_{t-1} - G_{t-1} - E_{t-1}} - 1 \right) \times 100\%$$

Where:

- D_t is the average price of diesel in year t
- G_t is the amount of GST paid in year t
- E is the fuel excise

Because of copyright, we are unable to provide the pump price information as part of the cost index spreadsheet. This information is available to those interested from FUELtrac upon payment of a fee. However the aggregate calculation is found in worksheet 3 of the model. The change in fuel costs is given in cell C18 of this worksheet.

3.3.3 Interest

Interest costs in the index are inflated by changes in the NAB business loan base rate. We obtain this information upon request from the NAB.

The inflator is calculated by comparing the weighted average interest rate for the year to September in the review period with the weighted average interest rate for the year to September in the base period. These values are an average of the interest rates in place in these time periods, weighted according to the amount of days the rates were in place.

The calculation of the interest inflator is shown below:

$$\Delta I = \left(\frac{\frac{\sum i_t d_t}{\sum d_t}}{\frac{\sum i_{t-1} d_{t-1}}{\sum d_{t-1}}} - 1 \right) \times 100\%$$

1 FUELtrac is an independent organisation which provides a fuel price monitoring service.
2 Marine vehicles receive a rebate on excise paid for fuel.

Where:

- ΔI is the value of the interest cost inflator
- i_t is the interest rate in year t
- d_t is the number of days the interest rate is in place

The calculation of the weighted average is found in column E of worksheet 4 in the model. The final inflator value is given in cell E9.

3.4 Step 4 – Calculate the change in costs

The SFCI and FFCI estimate the change in ferry costs by using the inputs and results of the calculations explained in the sections above to generate a weighted average increase in private ferry cost. The SFCI and FFCI are found in worksheet 1 of the model, in Tables 1.1 and 1.3.

Columns C and D in the tables input the weightings from step 1. Column F consists of the final inflator values from step 3. The weightings and inflators for each cost item are multiplied by each other in column G to provide each cost item's 'contribution to the change in the index'.

The overall change in ferry costs is the sum of each cost item's contribution to the index. For slow ferries this is found in cell G33 of worksheet 1, for fast ferries it is found in cell G46.

3.5 Step 5 – Calculate the change in fares

Our recommended changes in fares are applied to the master fare schedules in order to obtain the new recommended fares. The master fare schedule consists of the recommended fares in the previous year, prior to rounding.

If fare changes were applied to the rounded fare, small changes may be ignored altogether and over time, fare changes may deviate significantly from the recommended amount. Using a master fare schedule ensures that over time, actual fares will not deviate significantly from recommended fares due to rounding.

Fares are calculated in worksheet 5 of the model. Column E is the master fare schedule. The change in fares (found in cells C7 and C8) is applied to the master fare schedule to obtain the recommended unrounded fares, found in column G. This will be the base master fare schedule in next year's review.

In order to obtain the recommended fares outlined in the report, the new unrounded fares in column G are rounded to the nearest 10 cents. The final recommended fares are given in column H of worksheet 5.

We note that the base year's fares do not reflect fares currently being paid by passengers. This is because our recommendation to decrease fares was not accepted by the Director-General. As part of this review we have used last years master fare schedule as normal so that the recommended fares continue to reflect changes in private ferry costs over time. Please refer to the final report for this review for more detail on this issue.

3.6 Step 6 – Calculate the new weightings for next year's model

As discussed in section 2, after we have estimated the change in ferry costs through the use of the SFCI and FFCI, we update the weightings to be used in the next year's SFCI and FFCI.

The weightings are adjusted to account for changes in the price of each cost input over the review period. In this way the relative amount of each input remains constant while the weighting of each cost compared to total costs changes to account for changes in relative prices.

The weightings for next year's review are calculated in Tables 1.2 and 1.4 in worksheet 1 of the model. Column J in these tables adjusts the current weightings to account for changes in the prices of each input. Column K then resets the weightings so that they add to 100%.

4 Further detail on this guide and the model

If you have any inquiries regarding this guide or the accompanying Excel file, please contact the following staff member:

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