

Appendix D:

Economic surplus from telecommunications

To calculate consumer surplus from telecommunications, we used two annual ACMA communication reports. The reports calculated the gain in consumer surplus for Australia due to a reduction in price for a given year. For example:

- In 2007–08, for calls, there was a 21% decline in price (from 21.2¢ to 16.7¢), which resulted in an increase in quantity of 28% and an increase in consumer surplus of \$2,277 million
- In 2007–08, for SMS, there was a 40% decline in price (from 14.6¢ to 8.7¢), which resulted in an increase in quantity of 49% and an increase in consumer surplus of \$1,010 million
- In 2008–09, for calls, there was a 4.5% decline in price (from 28.7¢ to 27.4¢), which resulted in an increase in quantity of 6% and an increase in consumer surplus of \$491 million
- In 2008–09, for SMS, there was a 5.5% decline in price (from 9.1¢ to 8.6¢), which resulted in an increase in quantity of 17% and an increase in consumer surplus of \$92 million.

Assuming that the demand function is linear, we can derive the demand functions for each of the above cases – that is, the coefficients and constants for the linear equation.

Next, we grew the figures by the number of subscribers in 2010–11. According to ACMA, from 2008–09 to 2010–11, the number of mobile subscribers grew by 25% and from 2007–08 to 2010–11 the number of mobile subscribers grew by 34%. Using this information, we can calculate the corresponding price and quantity for each of the above equations. This enables us to calculate total consumer surplus in 2010–11.

Next, we apportion the total consumer surplus figures to estimate the avoidable losses based on this event. First, we apportion by carrier (Optus only), then by geography and population – that is, Brisbane only¹⁴ – and finally by time (daily basis). This results in a daily avoidable loss of consumer surplus of \$832,919 per day for Optus customers in Brisbane.

To calculate producer surplus, first we assume that this is represented by profits. According to IBISWorld (2015), telecommunications businesses retain 13% of revenue as profits. The same source states that in 2010–11, Optus earned \$6.0 billion in revenue, which suggests profits of about \$780 million. Weighting this profit by population share – that is, 2.1 million out of 22.5 million – we estimate Optus's 2010–11 profit in Brisbane to be \$71.6 million, or \$196,046 per day in 2010–11.

To obtain the total avoided loss in economic surplus, we add consumer surplus and profits (producer surplus), which we estimate to be about \$1 million per day.

To calculate the expected avoided losses, we weight these losses by the historical frequency of similar events and the duration of the outage. According to Van den Honert and McAnaney (2011), Brisbane experienced six major floods between 1840 and 2011 that were larger than the Brisbane floods in 2011. This implies a probability of 3.5% of a similar event occurring in a given year. Furthermore, we assume that the outage lasts three days.¹⁵ We estimate the expected avoided costs to be \$108,321. Assuming a 3% discount rate, this implies a \$3.6 million avoided cost in perpetuity, of which \$2.9 million is lost consumer surplus and \$0.7 million is lost producer surplus.

14. Brisbane had a population of about 2.1 million and Australia had a population of 22.5 million in 2011.

15. According to Optus, 150 out of 175 nodes remained down from 11 January 2011 to 13 January 2015.