Changes with observed prices and quantities

I estimate the price and quantities with the additional costs to the observed data. These are compared with the model estimates and the observed data. I compute the percentage changes in the price and quantity for fed cattle, cull cows as well as the aggregate producer surplus. The results are as follows:

Table 1: Percentage change in price of fed cattle

Year	percentChange_ps_obs	percentChange_ps_model
2010	-6.5766982	1.6306733
2011	-14.1895916	1.4796200
2012	-2.5595639	1.2555068
2013	0.7641544	1.1590637
2014	-16.0369276	1.1186796
2015	7.0056582	0.8945503
2016	26.6988327	0.9035895

Table 2: Percentage change in quantity of fed cattle

Year	percentChange_sl_obs	percentChange_sl_model
2010	0.5114821	-1.617407e-14
2011	0.3457242	0.000000e+00
2012	-2.7404237	0.000000e+00
2013	0.2974021	-1.643580e-14
2014	-2.5022686	-1.675859e-14
2015	-0.7994106	-1.773940e-14
2016	1.2584954	1.734328e-14

Here we have percentage change from the observed data and model respectively. The fed cattle price fell compared to observed, this is reflected in the quantities. The quantities went up by a little. The fed cattle prices went up compared to the model estimates. However, the quantities changed very little. Note that the price went by a little so we expect the same change in the quantities.

Table 3: Percentage change in price of cull cows

Year	percentChange_pc_obs	percentChange_pc_model
2010	-22.305687	3.535708
2011	-22.916642	2.729425
2012	-11.560880	2.094137
2013	-1.322547	1.829043
2014	-23.717126	1.767165
2015	1.929532	1.353151
2016	37.000319	1.363775

Although prices fell for cull cows (compared to observed prices), the quantities remained almost same. However the prices went up when compared to the model estimates and the quantities remained same or fell by a little.

Just note that cattle cycles play important role too. The observed data (especially stocks), follows the expansion and contraction of the stocks so our model does the same.

The aggregate producer surplus is negative for the first 5 years and then positive when we compare it to the observed data. However it is negative all the way when compared to the model.

Table 4: Percentage change in quantity of cull cows

Year	percentChange_cl_obs	percentChange_cl_model
2010	-0.5767056	1.130325e-05
2011	9.1561672	8.016228e-06
2012	8.1515734	1.013729e-05
2013	-8.3312239	1.063030e-05
2014	14.6568011	-1.535018e-05
2015	12.9117106	1.151384e-05
2016	11.5011345	9.786865e-06

Table 5: Aggregate producer surplus

Year	diffRevCost_t_obs	diffRevCost_t_model
2010	-2.1681188	-0.1577323
2011	-4.4930972	-0.1707075
2012	-2.1005092	-0.1675756
2013	-0.4705478	-0.1437623
2014	-6.9141243	-0.1545304
2015	1.8134526	-0.1474051
2016	7.5518716	-0.1561541

Changes with observed prices and quantities until 2009 and then model estimates from 2010

I estimate the price and quantities with the additional costs to the model estimates. These are compared with the model estimates and the observed data. I compute the percentage changes in the price and quantity for fed cattle, cull cows as well as the aggregate producer surplus. The results are as follows:

Table 6: Percentage change in price of fed cattle

Year	percentChange_ps_obs	percentChange_ps_model
2010	-10.603034	-2.74938210
2011	-15.509197	-0.08094854
2012	-3.289823	0.49665633
2013	-1.321448	-0.93471286
2014	-16.989992	-0.02911836

Table 7: Percentage change in quantity of fed cattle

Year	percentChange_sl_obs	percentChange_sl_model
2010	11.741485	11.172856
2011	4.600009	4.239627
2012	-0.277849	2.531961
2013	7.310272	6.992075
2014	1.570732	4.177534

The fed cattle price fell compared to observed, this is reflected in the quantities. The quantities went up. The fed cattle prices fell compared to the model estimates. Again, the quantities went up reflecting the fall in prices.

Table 8: Percentage change in price of cull cows

Year	percentChange_pc_obs	percentChange_pc_model
2010	-14.62216	13.774801
2011	-20.53594	5.902204
2012	-10.45579	3.369853
2013	2.05221	5.311585
2014	-22.29011	3.670906

Table 9: Percentage change in quantity of cull cows

Year	percentChange_cl_obs	percentChange_cl_model
2010	10.454190	11.094893
2011	13.807654	4.261322
2012	11.214696	2.832260
2013	-1.974307	6.934670
2014	19.723108	4.418655

The cull cow prices fell compared to the observed. This is reflected in the quantities for the cull cows. However, the prices and quantities of cull cows went up compared to the model estimates. This is a strange phenomena.

Table 10: Aggregate producer surplus

Year	diffRevCost_t_obs	diffRevCost_t_model
2010	-0.3326094	1.6777770
2011	-3.6351486	0.6872411
2012	-1.4358652	0.4970684
2013	1.4075129	1.7342984
2014	-5.7498617	1.0097323

The aggregate producer surplus fell when compared to the observed data. It went up when compared with the model estimates.