**Sample Questions on Logit and Multinomial Models**

1. Consider the Coke-Pepsi example from class 7. The estimated model is:
   1. What is the predicted market share of PEPSI if DispCoke = 0, DispPepsi = 0 and Pratio = 1?

The additional utility from consuming Coke is:

Predicted choice probability of PEPSI is given by

So predicted market share is 54.3%

* 1. In above case, how does the market share of PEPSI change if Coke uses a display?

If Coke uses a Display, then the additional utility from Coke is:

Predicted choice probability of PEPSI is given by

Therefore, market share of PEPSI decreases to 43.5%.

1. Consider the Coke – Pepsi – 7up example from class 8. The estimated model (version 1) is:
   1. What is the predicted market share of Coke if PriceCoke = 1, PricePepsi = 1.5 and Price7up = 1.2?

The utility for each alternative is:

Predicted choice probability for Coke is:

Therefore, market share of Coke is 47.3%

* 1. If the price of Coke increases to 1.1, which brand gains the most market share?

Predicted choice shares before price change:

Utility of Coke after price change:

Predicted choice shares after price change:

So 7up gained the most. Its market share increases from 32.9% to 36.5%

1. Consider the video game console example from class 9. The estimated model is:
   1. What is predicted market share of XBox if PriceXBox = 200, PricePS = 220 and PriceWii = 190?

Predicted market share of XBox

So market share is 34.2%

(NOTE: In this case, choice share is not the same as market share – That is choice share includes the option of no-buy, whereas market share is only based on those who buy)

* 1. What fraction of the overall market will buy a console?

Predicted choice share for No-Buy option:

So fraction of the overall market that will buy is 61.6%

* 1. If the market potential for video game consoles is 10 million units, what is the predicted sales for each of the consoles?

Predicted choice share for each console:

So Sales for XBOX = 2.11 Million units, PS = 2 Million units and Wii = 2.05 Million units.

* 1. If the price for Xbox drops by $10, how does it affect overall sales of consoles? How does it affect the sales of Xbox? What portion of the change in Xbox sales is from market expansion and what portion is from brand switching? Which brand loses the most sales?

In this case utility of Xbox changes to:

The predicted choice shares are:

Fraction of the overall market that will buy is 62.7%. So overall sales of consoles increases from 6.16 Million units to 6.27 Million units. Sales of Xbox increases to 2.32 million units from 2.11 Million units, an increase of 0.21 Million units. Of this increase, 6.27 – 6.16 = 0.11 Million units is due to market expansion, and the remaining is due to brand switching. In this example, both the other brands lose approximately 0.05 Million units in sales – so both are equally affected (ignoring round-off errors).

* 1. If the price for Xbox increases by $10 (from 200), how does it affect overall sales of consoles? How does it affect the sales of Xbox? What portion of the change in Xbox sales is from market contraction and what portion is from brand switching? Which brand gains the most sales?

In this case utility of Xbox changes to:

The predicted choice shares are:

Fraction of the overall market that will buy is 60.7%. So overall sales of consoles decreases from 6.16 Million units to 6.07 Million units. Sales of Xbox decreases to 1.91 million units from 2.11 Million units, an increase of 0.2 Million units. Of this decrease, 6.16 – 6.07 = 0.09 Million units is due to market contraction, and the remaining is due to brand switching. Wii gains the most in sales: 0.06 Million units compared to 0.05 Million units for PS.