

# Prediction Success Table

- Predicted Success Tables and Indices were proposed originally by McFadden (1979)
- Prediction success table is a cross classification between the predicted and observed alternatives

# Prediction Success Table

- Prediction success table is a cross classification between observed choices and predicted choices

Observed Choices	Predicted Choices			Row Totals	Observed Share
	TW	Car	PT		
TW	25	1	4	30	30%
CAR	2	7	1	10	10%
PT	4	1	55	60	60%
Column Totals	31	9	60	100	100%
Predicted Share	31%	9%	60%		
% Correctly Predicted	83%	70%	92%		

Overall prediction success rate = 87%

# Simple Method of Preparing Prediction Success Table

- Probability of choice of each alternative is computed for each observation in the data set using the calibrated utility function.
- The alternative mode with the highest probability is considered as chosen alternative, and this is compared with the alternative actually chosen.
- Prediction success table is then obtained by cross tabulation of these predicted and observed choices

# Example of Simple Method

S. No.	Predicted Probability			Observed Choice		
	Car	TW	Bicycle	Car	TW	Bicycle
1	0.3	0.3	0.4	0	1	0
2	0.5	0.2	0.3	1	0	0
3	0.7	0.1	0.2	1	0	0
4	0.1	0.1	0.8	0	0	1
5	0.2	0.5	0.3	0	0	1

# Prediction Success Table

Observed Choices	Predicted Choices			Row Totals	Observed Share (%)
	Car	TW	Bicycle		
Car	1+1=2	0	0	2	40
TW	0	0	1	1	20
Bicycle	0	1	1	2	40
Column Totals	2	1	2	5	100
Predicted Share (%)	40	20	40	100	
% Correctly Predicted	100	0	50	60	

# Exact Method

- Let the available data consist of observations of  $N$  individuals
- Let  $J$  is the number of alternatives available to each individual
- Let  $P_{ji}$  denote probability of individual  $i$  in the data set chooses alternative  $j$
- Define  $S_{ji} = 1$ , if individual  $i$  is observed to choose alternative  $j$  and 0 otherwise
- For each pair of alternative define  $N_{lk}$  as

- $$N_{lk} = \sum_{i=1}^N S_{li} P_{ki}$$

- And define,  $n_{lk} = N_{lk}/N$

# Exact Method

- $N_{lk}$  = number of individuals who are observed to choose alternative  $l$  and predicted by the model to choose alternative  $k$
- $n_{lk}$  = *proportion* of individuals who are observed to choose alternative  $l$  and predicted by the model to choose alternative  $k$
- Prediction success table is the  $J \times J$  array whose  $(l,k)$  element is either  $N_{lk}$  or  $n_{lk}$
- Proportion of trips correctly predicted for alternative  $l$  can be obtained as

$$C_l = \frac{N_{ll}}{\sum_k N_{lk}}$$

- Overall proportion of choices successfully predicted by the model can be calculated as

$$C = \frac{\sum_{l=1}^J N_{ll}}{N}$$